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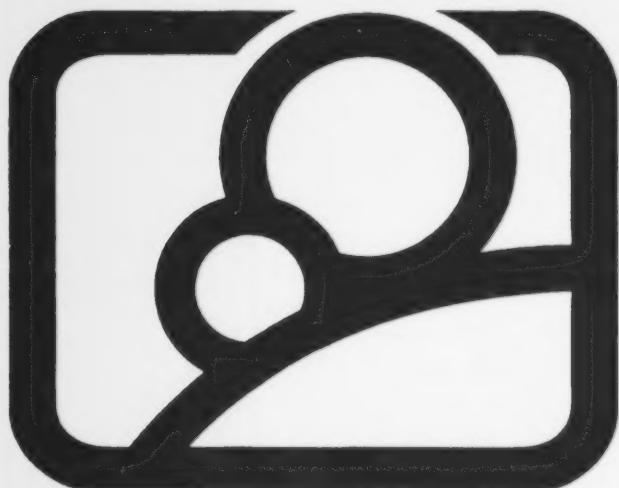
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ABSTRACT

The goal of the Developmental Approaches in Science, Health and Technology (DASH) program is to preserve the curiosity and capture the imagination of all elementary students through an experience of science, technology, and health that engages them in the excitement of exploring and understanding the unknown, inventing and building to solve problems, becoming better able to care for themselves, and gaining basic meaningful knowledge that will enable further school study. This document contains a teacher's guide for the Kindergarten level. The document is divided into sections based on content. Activities include: (1) Learning; (2) Time, Weather and Sky; (3) Animals; (4) Plants; (5) Food and Nutrition; (6) Health and Safety; (7) Wayfinding and Transportation; (8) Energy and Communication, Conservation, Recycling, and Decomposition; and (10) Matter, Space and Construction; (11) Start-up Activities; (12) Activity Plans; (13) Scope and Sequence; (14) Material List; and (15) Complimentary Materials. Each lesson plan includes objectives, background, student role, required materials, product, and procedure information. (Author/YDS)

ED 482 648

Grade K Teacher Guide



DASH

Developmental Approaches in Science, Health and Technology



Curriculum Research & Development Group
University of Hawai'i

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DEVELOPMENTAL APPROACHES IN SCIENCE, HEALTH AND TECHNOLOGY (*DASH*) PROGRAM GRADE K TEACHER GUIDE

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DASH PROGRAM LEARNING GOALS

The goals and objectives of DASH are included in the DASH Teacher Guides at each grade level. There are four tiers of goal statements in DASH. The overview, Tier 1, is the DASH program goal for students expressing the program's aspirations for students. At Tier 2 are fifteen program learning goals which categorize general kinds of learning DASH students at all grade levels should work toward to achieve the program goal for students. At Tier 3 are the DASH grade level activity learning goals that are specific for each activity and constitute subcategories of learning within the program learning goals. At the base, Tier 4, are the activity objectives that stipulate what the student should do to reach the activity learning goals. Listed here are the Tier 1 and Tier 2 program learning goals which embrace the entire program. Activity learning goals are found after each cluster's title page and the activity objectives are found within each activity of DASH grade level Teacher Guides.

The DASH program goal for students is to preserve the curiosity and capture the imagination of all elementary students through an experience of science, technology, and health that engages them in the excitement of exploring and understanding the unknown, inventing and building to solve problems, becoming better able to care for themselves, and gaining basic meaningful knowledge that will enable further school study.

The learning goals of DASH are to begin development of and increase students'

1. knowledge and understanding of the foundational concepts of the natural sciences.
2. knowledge and understanding of the concepts fundamental to maintenance of human health.
3. knowledge and understanding of the operations of the technologies.
4. knowledge and understanding of the connectedness of the sciences, technologies, and the needs of society.
5. abilities to inquire about the unknown in the world about them using the tools of science.
6. abilities to invent, design, make, and test solutions to problems.
7. abilities to use the knowledge of science, health, and technology in new situations.
8. abilities to apply language, mathematics, and pictorial conventions as they are needed in science, health, and technology studies.
9. abilities to work cooperatively, collaboratively, and independently as appropriate in science, health, and technology contexts.
10. commitment to the well-being of the natural environment.
11. commitment to the well-being of self and community.
12. awareness of the importance of personal learning about science, health, and technology.
13. learning the ways of science, health, and technology for the excitement and pleasure they bring without concern for gender, ethnicity, or perceived ability.
14. readiness for the science experience of later studies.
15. appreciation for the contributions science, health and technology make to society.



**KINDERGARTEN
CLUSTER 1**

Learning

- K.1.1 Learning Calendar
- K.1.2 The Class Responsibility Chart
- K.1.3 Calendar Review
- K.1.4 Home Learning Calendar
- K.1.5 The Science Record Book
- K.1.6 Using Our Senses
- K.1.7 Same and Different
- K.1.8 Physical Characteristics of Things
- K.1.9 Functions of Things
- K.1.10 The Working Dictionary and Working Definitions
- K.1.11 The Wonder and Discover Book
- K.1.12 Connections
- K.1.13 Families
- K.1.14 Families and Helping
- K.1.15 Making Friends
- K.1.16 Being Friends
- K.1.17 School and Home
- K.1.18 Concept and Skill Inventory



K.1.1 THE LEARNING CALENDAR

OBJECTIVES

The students

- keep a record of astronomical, weather, seasonal, and other environmental observations on the Learning Calendar
- record what the class has learned on the calendar
- record important events on the calendar
- report events of the school day to others, especially their family
- periodically review the calendar

BACKGROUND

THE LEARNING CALENDAR is designed to be a starting activity. When possible, it should be quickly followed by Activities K.1.2 THE CLASS RESPONSIBILITY CHART, K.2.1 WEATHER WATCH, and K.1.3 CALENDAR REVIEW. Other connected activities are K.1.4 THE HOME LEARNING CALENDAR, K.3.1 APPROPRIATE PETS, K.2.6 MOON WATCH, and K.2.8 SEASONS.

The Learning Calendar

The Learning Calendar is a daily record of what students do in a *DASH* classroom. On the calendar the students record long-term astronomical, weather, seasonal, and other observations as well as things learned and special events of the school day. Periodic opening of the calendar refreshes the students' memory of what has been experienced over the year. Other devices to record the progress of learning are the Science Record Book, the Working Dictionary, the Connections Book, the Wonder and Discover Book, and the Concept and Skill Inventory.

Long-term record

The Learning Calendar is designed to be kept for review in subsequent levels of *DASH*. When completed, the calendar can be stored in the library for later data analysis.

Types of Learning Calendars

The Learning Calendar is a continuous record, usually on a single strip of paper. A strip may hold information for the full year, a semester, a month, or a week. From this record emerges a sense of continuity of events and time metaphors—length of time, long time, short time, time past, time present, and future time.

Two types of calendars are commonly used, the fan-fold and the roll type. Fan-fold calendars use computer paper. This allows the record to appear in book form when folded and as an extended strip when opened up. Roll-type calendars use butcher or other heavy-duty roll paper.

Recording on the calendar

In kindergarten student calendar records are mainly drawings. Research shows that events recorded in pictures are well remembered by students. A word or two written to describe an event will help advance the process of word recognition as well as jog the teacher's memory as to the meaning of the pictures.

When to record

Recording of the day's activities should be done in a way that fits the teacher's routine. For example, calendar work may be started in the morning and added to throughout the day.

Daily calendar review and parents

At the end of the day review the calendar to help the students recall what they have learned. Ask for the help of families in reinforcing students' remembering. Suggest that instead of asking, What did you do in school today? they ask, What was put on the calendar today? then, Why was that put on the calendar? Asking about the calendar provides students with a concrete reference to clue their memories.

Year-to-date calendar review

The calendar should be periodically opened for a review of all that has been learned and done in class to date. See Activity K.1.3 CALENDAR REVIEW.

Calendar content

Start with the day of the week, date, general weather observations, things learned, and other events of note for the day. The number of items to be reported on the calendar will increase as the year progresses. See Fig. K.1.1.

**Suggested Content of
a *Dash* Kindergarten
Learning Calendar**

Day of the Week* and Date*

Data Collection

Kind of weather*
Temperature (°F, °C)
Weather logos
Wind speed
Moon phases
Seasonal observations

Special Events

Birthdays*
Holidays*
School events*

What We Learned in School Today*

Special News

* *Suggested starting entries*

Fig. K.1.1 Suggested content of the *DASH* Kindergarten Learning Calendar

Student roles

In all *DASH* activities the students are made aware of the professions that do work similar to the work they are doing. Before they start an activity, the students should be given work roles. Using this technique from the very beginning of their schooling, the students can get a sense of importance of what they are learning. In recording weather, astronomical, and environmental data and observations they are scientists— meteorologists, astronomers, and naturalists. In recording the events of the day they are historians and record keepers.

Student responsibility

After a brief demonstration period when the teacher records events, responsibility for the content of the calendar should fall on the students. Calendar routines provide a natural way for development of individual and group responsibility. See Activity K.1.2 THE CLASS RESPONSIBILITY CHART.

Teaching as a responsibility

Students have a responsibility as scientists to share, thus to teach, what they know and can do. For example, a first group of students is taught how to read a thermometer by the teacher. Members of this group then become the teachers of a second group taking readings. This second group then teaches a third group and so forth. This *what-I-learn-I-teach* approach is used at all levels of DASH.

Assessment

The calendar is a remarkably rich assessment tool. It can give a wide range of insights into group and individual skills, concepts, and social development. Things that can be looked for include

- recording and drawing skills
- instrument-reading skills
- concepts remembered at the end of the day
- concepts remembered at the time of calendar unrolling
- responsibilities that have been carried out
- social interactions

Initials can be added to records to identify students who have made contributions to the calendar.

STUDENT ROLES

Meteorologist
Astronomer
Naturalist
Historian
Chronologist

MATERIALS

DASH Calendar-in-a-Box, a 24-inch roll of heavy paper, or heavy-weight folded computer paper
colored markers

PRODUCT

Learning Calendar

PROCEDURES

1. **Point out the importance of records to scientists and historians. Introduce the calendar as a class record of observations and events. Organize role-groups (historians, record keepers, meteorologists) to carry out calendar tasks.**

Help the students start the calendar.

- Write the day of the week and the date on the calendar.
- Record a general weather observation using pictures or logos for different conditions.
- ✓ For suggestions see Activity K.2.1 WEATHER WATCH.

2. **At the end of a school day, help the students record the highlights of the day.**

Help them do the following:

- Record the highlights in drawings or logos.
- Suggest a few words about the meaning of the drawings for you to add to the calendar.

3. **Review the day's events and help the students think about and discuss them. Reinforce and connect things learned.**

Ask such questions as these:

- What were the things that happened today?
- What do you remember about those things?
- What new things did you learn today?
- How did what we learned yesterday help us with the things we learned today?

4. **Help the students think of things they want to tell their family and others about what they did at school. Encourage them to share what they learned when they get home.**

5. **As soon as possible set up a Class Responsibility Chart. See Activity K.1.2 THE CLASS RESPONSIBILITY CHART.**
 6. **Expand the content of the calendar over the year.**
 - Add outdoor temperature, wind indicator reading, precipitation, and so forth as the year progresses.
✓ For additional weather data see Activity K.2.1 WEATHER WATCH.
 - Record observations on seasons as changes occur.
✓ Work for general observations such as fields are being harvested, leaves are falling, trees and flowers are budding, and so forth. See Activity K.2.8 SEASONS.
 - Add other observations when the students begin long-term data collection activities.
✓ For other examples see Activities K.2.6 MOON WATCH and K.3.1 APPROPRIATE PETS.
-

EXTENSIONS

- Roll out the Learning Calendar at open house and have the students show their family what they have learned.
- At open house have the students demonstrate how they record data and events on the Learning Calendar.



K.1.2 THE CLASS RESPONSIBILITY CHART

OBJECTIVES

The students

- plan for carrying out classroom responsibilities
- record the completion of their assigned responsibilities

BACKGROUND

THE CLASS RESPONSIBILITY CHART is designed to immediately follow Activity K.1.1 THE LEARNING CALENDAR. Other early activities are K.2.1 WEATHER WATCH, K.1.3 CALENDAR REVIEW, K.1.4 THE HOME LEARNING CALENDAR, K.2.6 MOON WATCH, and K.3.1 APPROPRIATE PETS.

Responsibility

DASH is designed to model working teams of scientists and technologists. The teacher is a team leader. It is essential to the operation of modern technologies and sciences that responsibilities be carried out by doing jobs with care within a reasonable period of time. *DASH* activities, therefore, are designed to instill a sense of individual and group responsibility for all that is done. There are many jobs in the classroom, and the class team members need to know who is assigned to each job, when the job is to be done, and when the job is completed.

Class Responsibility Chart

A Class Responsibility Chart is needed that lists jobs and the names of students who are to do them each day will help keep track of job assignments. The chart should be designed so that

- jobs can be add or deleted as situations change
- student assignments can be regularly changed
- a check-off system can be used to clearly show when jobs have been completed

Assignments

A good time to start the Responsibility Chart is within a week or so of the introduction of the Learning Calendar. By that time the students can begin to take over the filling in of the day of the week and date on the calendar. Shortly, responsibility for placing logos for weather and wind

conditions as well as recording temperature can be added. As animals are brought into the classroom, their care can be assigned to students. All these jobs should be listed on the Class Responsibility Chart.

Grouping

It is suggested that students work in groups to carry out jobs. This helps ensure that someone will usually be present to carry out each job. By grouping students it is possible to have them do peer teaching as it is done in science and industry where colleagues teach colleagues.

Job review

A short time on Monday mornings or Friday afternoons can be used for checking the Responsibility Chart. Jobs can be rotated at the time of review, and responsibilities can also be added to or removed from the chart. This is a time to review the connection to the professional job world—meteorology, reporting, animal caretaking, and so forth.

STUDENT ROLES

Meteorologist
Reporter
Chronologist
Animal caretaker
Naturalist
Supervisor
Planner
Substitute for absent students
Others as they develop

MATERIALS

marking pens
chart paper
materials as needed
Student Page K.1.2 JOBS AT HOME

PRODUCTS

Class Responsibility Chart
Pet job descriptions
Completed Student Pages

PROCEDURES

1. Briefly discuss the Class Responsibility Chart.

Ask such questions as these:

- How can we keep track of our responsibilities?
✓ Work to the idea of a Class Responsibility Chart.
- Why is it important to keep a record of who does what jobs?
- How can we keep track of when we have done our jobs?
- What happens when we do not do the things we agreed to do?
- Why might it help if we have more than one person assigned to each job?
- What should we do if someone is absent?
- Would it help if we had a person assigned to be a substitute for people who are absent?
- Do we need a supervisor?

2. Have the class create a list of jobs and the work that needs to be done.

- Discuss and list what kind of jobs need to be done to keep the classroom neat, clean, and running smoothly.
- List the information that needs to be collected and recorded daily on the Learning Calendar.
✓ Include collecting and recording wind, temperature, and weather data; the day of the week and date; and the things learned that day.
- When pets are brought into the classroom, post a pet job description next to their cages.
✓ Include such things as watering, feeding, exercising, cleaning the cage, and so forth.

3. Set up recording procedures for the Class Responsibility Chart.

- Put the jobs on the chart.
 - Post job descriptions.
 - Decide on a job selection-and-rotation process.
4. **Each week review the record of accomplishment and rotate the assignments. Have the students suggest ways to improve their work.**
- Check to see that all the things on the pet job description have been carried out.
 - During the course of the year regularly ask whether any new jobs need to be added or some jobs removed from the list.

EXTENSION

- Send a letter home explaining and encouraging the use of Student Page K.1.2 JOBS AT HOME.



K.1.3 CALENDAR REVIEW

OBJECTIVES

The students

- unroll the Learning Calendar and review its contents
- review the past and relate it to the present
- make predictions about the future based on past and present events

BACKGROUND

CALENDAR REVIEW is designed to follow Activity K.1.1 THE LEARNING CALENDAR, K.1.2 THE CLASS RESPONSIBILITY CHART, and K.2.1 WEATHER WATCH. The first calendar unrolling, outlined here, usually precedes Activities K.1.4 THE HOME LEARNING CALENDAR and K.2.6 MOON WATCH.

Calendar unrolling

Unrolled, the Learning Calendar provides a way to show connections between past and present events and an opportunity to make predictions about the future. It also gives a way of showing the growth in understanding about science, health, technology, and other school subjects.

When to unroll the calendar

In the beginning unroll the calendar once a week, then monthly for several months, and finally, at least once each remaining school quarter.

STUDENT ROLES

Chronologist
Calendar keeper
Historian

MATERIALS

Learning Calendar
marking pens
STUDENT PAGE K.1.3 CALENDAR REVIEW

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PRODUCTS

Completed Student Pages

PROCEDURES

1. **Regularly unroll the Learning Calendar to show the events of the school year from the beginning to the present.**

Help the students do the following:

- Find and compare past and present events.
- Generalize about what they have learned so far.
- Build the idea that the future lies ahead.
- Make predictions about such things in the future as when birthdays, school events, and vacations will happen and record them on the calendar where they will occur.

2. **In early unrollings, discuss the Learning Calendar using descriptive words to report highlights. Encourage the students to use their imagination.**

Ask such questions as these:

- Do you remember what this picture was about? What was it?
✓ Select several prominent pictures to think back on and talk about.
- Are there other things that you find that you remember? What are they?
- Can you find pictures of things that you have learned on the calendar? What are they?
- Are there things on the calendar that follow each other?
✓ Get at things such as the days of the week, rain followed by clearing, the daily routine, and so forth.
- What is your favorite thing recorded on the calendar?

3. **Have the students close their eyes and think of ways things on the calendar were connected with other things.**

Give examples such as these:

- When rain is shown on the calendar, I see raincoats. What do you think of?
✓ Get as many contributions as possible.
- When strong wind is shown on the calendar, what do you think of?
- When a pet is shown on the calendar, what do you think of?
- When a moon is shown on the calendar, what do you think of?

4. Use Student Page K.1.3 CALENDAR REVIEW for summarizing the year's events.

- To conclude the year on a high note, have the students make a drawing that captures the positive things that occurred.
✓ Get at such things as drawing the events of a favorite day, the most exciting day of the year, the most important day of the year, and so forth.

EXTENSION

- At the end of the day have one student predict something about the next school day. Record this on the next panel of the calendar and help the students check to see whether the prediction was correct.



K.1.4 THE HOME LEARNING CALENDAR

OBJECTIVES

The students

- keep a Home Learning Calendar

BACKGROUND

THE HOME LEARNING CALENDAR usually follows Activities K.1.1 THE LEARNING CALENDAR, K.1.2 THE CLASS RESPONSIBILITY CHART, K.2.1 WEATHER WATCH, and K.1.3 CALENDAR REVIEW.

Home Learning Calendars

To continue strengthening the students' reporting and memory skills over vacations, enlist families' help in keeping a Home Learning Calendar. A daily, or more likely occasional, report session at home during a vacation will provide continued practice in remembering and communicating. See Student Page K.1.4 HOME CALENDAR. A sample letter is given in Fig. K.1.4.

When to use

Right before the long winter vacation is an ideal time to send home the Home Learning Calendar. Since use of the calendars is voluntary, they need not be returned to school. Lack of family participation will not hinder the ongoing program.

STUDENT ROLE

Calendar keeper

MATERIALS

letters to families
Student Page K.1.4 HOME CALENDAR

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PRODUCTS

Completed Student Pages

PROCEDURES

1. **Before a vacation send a letter to the students' families outlining the use of the Learning Calendar in the classroom and its value as a way to sharpen memory and communicating skills. Suggest that they may want to continue the routine by helping their child keep a Home Learning Calendar. See the sample letter in Fig. K.1.4. Include Student Page K.1.2 HOME CALENDAR with your letter.**

- Discuss how the students can keep a record of what they do over the upcoming vacation.
- Discuss the letter and calendar with the students.
- Discuss why they might want to keep a record of what they do.

2. **After the vacation discuss what the students put on their Home Learning Calendars.**

Ask such questions as these:

- Can anyone remember something you put on your Home Learning Calendar? What was it?
 - How did you record what you put on your calendar?
 - Is there something else you wish you had put on your calendar? What is it?
-

EXTENSION

- Ask the students to bring in for sharing special calendars that they have at home. These might be calendars with different pictures, advent calendars, tide calendars, and so forth.
- Encourage the students to keep a Home Learning Calendar over the spring and summer vacations.

KEEPING A HOME LEARNING CALENDAR

Dear Family:

For the past several months your child has been reporting the major events of the school day on a Learning Calendar. The Learning Calendar is a log or diary of things that children find important and want to remember. In our class it is mainly a collection of pictures of things that have happened during the day. I add a few words of description so I can remember what the pictures mean. This helps reinforce the importance of writing. The students tape photos or other items on the calendar. Children usually remember the story behind pictures quite well.

Over the coming vacation there will be an opportunity for you to be involved in this exciting activity by helping your child keep a Home Learning Calendar. Recording vacation events will give your child continuing practice in remembering and communicating.

Just as important as recording will be talking about the events once they are put on the calendar and reviewing the calendar at the end of the vacation. A sample page of one form of Home Learning Calendar is enclosed. This page can be used or modified as you and your child see fit.

Make entries as often as they are convenient. Enjoy using the calendar, and please let me know how this activity works out.

Holiday greetings,

Fig. 4.1.4 Sample letter about the Home Learning Calendar



K.1.5 THE SCIENCE RECORD BOOK

OBJECTIVES

The students

- discuss the need for saving long-term data
- store information for future reference

BACKGROUND

Records are as essential to students as they are to scientists and technologists. *DASH* uses numerous record-keeping devices. These include the Learning Calendar, the Class Responsibility Chart, the Connections Book, the Working Dictionary, the Wonder and Discover Book, concept maps, class charts, the Concept and Skill Inventory, and the Science Record Book, which is introduced here.

Science Record Book

The Science Record Book is the book or folder in which the students store their student pages, observations and data, plans, designs, and other important *DASH* papers. It holds a record of the students' personal physical and intellectual growth.

When to start

The Science Record Book can be introduced with the first activity involving a student page.

Types of Science Record Books

The Student Record Book may be a three-ring binder, a student-made book, a manila folder, a 12 x 18-in. piece of oaktag folded in half, and so forth. The form is open to invention; however, the materials should be sturdy enough to withstand several years of student use.

Library storage

Ideally the Science Record Books will be stored in the library at the end of the year to be retrieved by the students and used again in the first grade. This process continues through grade six. Prior to storage, the Science Record Books should be reviewed and items that will not be used in grade 1 sent home.

BEST COPY AVAILABLE

Records to keep

Some records that should be kept from year to year include the following:

- height and weight records
- hand and foot tracings
- tooth charts
- data from decomposition activities
- concept and skill inventories
- other ongoing records that will be added in grades 1-5

Assessment

The Science Record Book is a primary source of materials for any portfolio assessment of student products. It is a long-term record of the students' development.

Students leaving school

Students who move to other schools should take their Science Record Books with them. They may be moving to another *DASH* school.

STUDENT ROLES

Scientist
Record keeper

MATERIALS

binders, oaktag, cardboard, or manila folders for Science Record Books
indexes (optional)
fastening devices
markers for labeling

PRODUCTS

Science Record Books
Completed Student Pages

PROCEDURES

1. Discuss with the students the need for a way to keep important papers.

Ask such questions as these:

- Why do we need to keep records of things we do?
- How could we store our papers so we won't lose them?
✓ Point out that scientists and engineers keep records of what they do.

2. **For the Science Record Book use standard binders or help the students make their own.**
3. **Help the students label and decorate their Science Record Books.**
 - Be sure they include an inside sheet with their name, classroom, grade level, and school year.
4. **Help the students store their Science Record Books in an appropriate place. A book or folder kept on a special shelf or other special place has more import than one kept in a desk.**
5. **At the end of the school year ask the librarian to store the students' Science Record Books to be retrieved next year for use in the first grade.**
 - Before storing, review the Science Record Books with the class and send home unnecessary items.

EXTENSION

- Help the students invent a way to organize the contents of their Science Record Books.



K.1.6 USING OUR SENSES

OBJECTIVES

The students

- use their senses to describe selected objects
- identify the different senses used in collecting the information
- relate properties of things registered by their senses

BACKGROUND

USING OUR SENSES usually precedes Activities K.1.7 SAME AND DIFFERENT, K.1.8 PHYSICAL CHARACTERISTICS OF THINGS, K.1.9 FUNCTIONS OF THINGS, and K.1.10 THE WORKING DICTIONARY AND WORKING DEFINITIONS.

Observation and senses

This activity is designed to encourage the students to observe the commonplace things around them and to think about how they make their observations. Using song and body motion, they name objects, describe their properties, and identify the organs of sense they use.

Senses and properties

In USING OUR SENSES the students are introduced to the senses of sight, hearing, touch, smell, and taste. They associate these senses with their sensing organs—eyes, ears, skin, nose, and tongue—and identify the properties of objects that can be sensed—color, sound, texture, temperature, odor, flavor, and so forth.

Use of song

There is strong evidence that musical and rhythmic forms of expression enhance memory. They also allow expression of emotion. For these reasons DASH often uses song, rap, rhyme, and chant. In this activity song is playfully used to get the students to recall what they have observed on the way to school.

Use of body motion

The brain specially responds to body motion, and this provides another path for learning. Polynesian people used dance and chant to recount their history. Mimes use hands, bodies, and facial expressions as an

alternative to speech to describe the world. Through pantomime the students can take advantage of kinesthetic learning and make experiences more lasting.

Help the students become inventive in their use of body motion and facial expressions. For example, degrees of loudness can be expressed by cupping or closing the ear. Pleasant or unpleasant odors can be expressed by breathing deeply or holding the nose, color by pointing to similarly colored objects, and so forth.

STUDENT ROLES

Observer
Reporter

MATERIALS

What Did You See on Your Way to School? song
Student Page K.1.6 WHAT I SAW ON THE WAY TO SCHOOL

PRODUCTS

Completed Student Pages

PROCEDURES

- 1. Begin by singing a question to the students. Then have them sing the answer back while using body gestures to point to the organ of sense involved in observation. Have them use gestures to help describe the things they observed. See Fig. K.1.6. The song is sung to the tune of *London Bridge Is Falling Down*.**

Help the students do the following:

- Sing their response.
- Point to the part of their body (organ of sense) used in observing properties identified—eyes, ears, nose, and so forth.
- Use body movements and facial expressions to help describe objects.
 - ✓ Show shape, size, texture, sound, and odor with hands and body.
- Use the suggested verses below or invent your own in response to what the students identify.

WHAT DID YOU SEE ON THE WAY TO SCHOOL?

(Sung to the tune of London Bridge Is Falling Down)

TEACHER TO STUDENT

What did you see on your way to school?
Way to school, way to school,
What did you see on your way to school?
The way to school this morning.

STUDENT'S RESPONSE

I saw a on my way to school,
Way to school, way to school.
I saw a on my way to school,
The way to school this morning.

TEACHER TO STUDENT

Where did you see on the way to school? Etc.

STUDENT'S RESPONSE

I saw it on the on the way to school. Etc.

TEACHER TO STUDENT

What color was on the way to school? Etc.

TEACHER TO STUDENT

How tall was on the way to school? Etc.

TEACHER TO STUDENT

What did sound like on the way to school? Etc.

TEACHER TO STUDENT

What did smell like on the way to school? Etc.

TEACHER TO STUDENT

What did feel like on the way to school? Etc.

TEACHER TO STUDENT

What did taste like on the way to school? Etc.
(Use taste only if food is involved.)

Fig. K.1.6(1) The *What Did You See on the Way to School?* song

2. Discuss reporting about things we see on the way to school.

Ask such questions as these:

- Does using your hands and body help you describe or tell what a thing is? How?
- How do you think using our hands and body helps someone else understand what we mean?
- Does describing things in song help you? How?

3. Discuss the senses and how they help us to tell about what we find or observe on the way to school.

Ask such questions as these:

- How do you see things?
✓ Work to the idea that we see things with our eyes. Add that our eyes give us our sense of sight.
- How do you hear things?
✓ Work to the idea that we hear things with our ear. Add that our ears give us our sense of hearing.
- How do you feel things?
✓ Work to the idea that we feel things with our skin. Add that our skin gives us our sense of touch.
- How do you smell things?
✓ Work to the idea that we smell things with our nose. Add that our nose gives us our sense of smell.
- How do you taste things?
✓ Work to the idea that we taste things with our tongue. Add that our tongue gives us our sense of taste.

4. Repeat the lesson over several days or weeks, including as many properties as possible.

Include the following:

- Sense of sight and associated properties
 - Color
 - Size
 - Shape
 - Pattern

- Sense of hearing and associated properties
 - Pitch
 - ✓ Get at high/low pitch.
 - Intensity or amount
 - ✓ Get at soft/loud intensity and pain.
 - Beat
 - ✓ Get at fast/slow beat.
- Sense of touch and associated properties
 - Feeling
 - ✓ Get at rough/smooth, soft/hard, sharp/dull, and others.
- Sense of pressure and associated properties.
 - Weight
 - ✓ Get at heavy/light and pain.
- Sense of temperature and associated properties
 - ✓ Get at hot/cold and pain.
- Sense of taste and associated properties
 - ✓ Get at sweet and sour, bitter and salty.
 - ✓ **CAUTION:** Ask the students about tastes *only* if the thing they are observing is food. Remind them that it is dangerous to taste things that are not foods.
- Sense of smell and associated properties
 - ✓ Smells are described as being like something known—like fruit, perfume, foul odors, and so forth.

- 5. After each session, discuss the properties of the things observed, the organ of sense used to detect the properties, and the name we give to the sense associated with the organ (color-eye-sight, sound-ear-hearing, and so forth).**

EXTENSION

- Have the students lead the *What Did You See on the Way to School?* song.



K.1.7 SAME AND DIFFERENT

OBJECTIVES

The students

- classify items according to their similarities and differences

BACKGROUND

SAME AND DIFFERENT introduces classification of objects. It builds on Activity K.1.6 USING OUR SENSES and, if possible, should be followed by Activities K.1.8 PHYSICAL CHARACTERISTICS OF THINGS, K.1.9 FUNCTIONS OF THINGS, K.3.4 LIVING AND NOT-LIVING, and K.3.5 ANIMALS AND PLANTS.

SAME AND DIFFERENT is also part of a series leading to the development of working definitions in Activity K.1.10 THE WORKING DICTIONARY AND WORKING DEFINITIONS. Notice that *DASH* activities are often part of more than one developmental series.

Focus Book

Exploration of things that are the same and different begins by using the Focus Book *Same and Different*. The story is about two children who have similar likes and pleasures but because of gender wear different party clothes. The Focus Book provides an opportunity to talk about things that are different and things that are alike or about the same.

Same and Different Game

The students next play the Same and Different Game in which they sort items into six or more different major categories. Each major category is made up of some set of common classroom items such as paper clips, books, pencils, and so forth. Objects in a category have the same form and function. The *form* of an object refers to its appearance, what it is made of, and its parts and their organization. The *function* of an object refers to what it does or is used for.

Building a master collection

The same master collection of items in this activity can be used in Activities K.1.8 PHYSICAL CHARACTERISTICS OF THINGS and K.1.9 FUNCTIONS OF THINGS. The master collection needs to have six or

more major categories, each with two component categories. One of the two component categories should have items that all look the same. The other component category should have the same kind of items, but they should look different from all the other items. For example, *lead pencils*, the major category, could have a *same pencils* category with three brand-new white pencils and a *different pencils* category with three used, different-colored lead pencils. See the chart in Fig. K.1.7.

SOME SUGGESTED ITEMS FOR A MASTER COLLECTION OF GAME ITEMS

Major Category: Pencils Category: new lead pencils that look the same (3 items) Category: used lead pencils that look different from each other and all other pencils, for example, different colors, different lengths, etc. (3 items)	Major Category: Paper Clips Category: new paper clips that look the same (3 items) Category: used paper clips that look different from each other and all other paper clips, for example, different colors, sizes, etc. (3 items)
Major Category: Books Category: new books with the same title (3 items) Category: used books each with a different title (3 items)	Major Category: Rulers Category: new rulers that look the same (3 items) Category: used rulers that look different from each other and all other rulers, for example, different colors, materials, etc. (3 items)
Major Category: Paper Category: new sheets of paper that look the same (3 items) Category: used sheets of paper that look different from each other and all other sheets of paper, for example, different colors, sizes, etc. (3 items)	Major Category: Crayons Category: new crayons that look the same and are the same color (3 items) Category: used crayons that look different from each other and all other crayons, for example, different colors, lengths, etc. (3 items)

Fig. K.1.7 Chart of suggested items for a Same and Different master collection

Playing the game

The teacher and students work together to create major category names such as *pencils*, *rulers*, *paper clips*, and so forth as two or three different kinds of things or items are drawn from a container holding the master collection. They then match other items with existing categories or create new categories when different kinds of items are presented. They invent a logo to represent each category, for example, a picture of a pencil or a ruler.

Skill development

If a large number of students have difficulty in grouping the items in the collection, play the game several times before going on to Activity K.1.8 PHYSICAL CHARACTERISTICS OF THINGS where the skills of classifying are refined.

To reinforce the idea of classification, set up a classification center. After students have successfully classified items in the center, they can become "experts" who check other students' classification. The teacher need be involved only when there are differences of opinion on classification schemes.

STUDENT ROLES

Classifier
Observer

MATERIALS

Focus Book *Same and Different*
collection of items
Post-it notes
Student Page K.1.7 SAME AND DIFFERENT

PRODUCTS

Completed Same and Different Game
Completed Student Pages

PROCEDURES**1. Read the Focus Book *Same and Different*.**

Ask such questions as these:

- What were some things the children in the story shared?

- How were the children the same?
 - In what ways were the children different?
 - Do you think that they were the same and different in other ways? What ways?
- 2. Introduce the Same and Different Game using items from the master collection. Keep the items in a container so that they can be seen only when pulled out. Have the students focus on the major category names (pencils, paper clips, paper, and so forth). At this time don't worry about differences between items (old and new or other differences) in the major category.**
- Pull an item from the container and help the students give it a name.
 - ✓ Ask, What is this? or What do we call this? The name they suggest will usually tell what kind of thing the item is and be its category name.
 - Draw a box or circle on the floor or on chart paper and put the item in it.
 - Help the students invent a logo to represent the item.
 - ✓ They could, for example, draw a picture of a pencil or a paper clip, and so forth.
 - ✓ Logos can be drawn on Post-it notes.
 - Write the category name so that the students get continuing reinforcement of the importance of writing.
 - Show the students another item and ask them whether it is the same or different from the one already out in the circle or box.
 - If it is different, put it in a different box or circle. Give the item a name and a logo.
 - If it is the same, place it in the box with similar objects.
 - ✓ Start using the term *category* to describe the box or circle and the items in it.
 - Ask why they put the item where they did.
 - ✓ Usually students will say that they look alike or do the same things.

- Ask why they didn't put the items in some other category.
- Continue until the students are reasonably fluent with the ideas of *same*, *different*, and *category*.
✓ If the students have difficulty, repeat the game in the next day or so.

3. Summarize the activity and then have the students complete Student Page K.1.7 SAME AND DIFFERENT.

Ask such questions as these:

- What do you mean when you say that something is in a *category*?
✓ Work to the idea that the thing shares a name with other things in the category and is like them.
✓ Work to such things as new, old, and used pencils are in the *pencils* category; new, old, and beat-up cars are all in the *cars* category. In each case items of the category share some properties and do the same thing.
- When do we need to know whether things are the same or different?

EXTENSION

Start a Sameness Chart.

- Tape an object such as a pencil to chart paper and every day have a student add a different object that is like it in some way.
- Have the student tell how the object is like the pencil and suggest a category name that would fit both objects. For example, *wooden things* would fit both a stick and a pencil; *writing tools* would fit both a pen and a pencil.
- To stretch the imagination of the students, add an object yourself.



K.1.8 PHYSICAL CHARACTERISTICS OF THINGS

OBJECTIVES

The students

- are introduced to two-category (dichotomous) classification
- classify objects by their physical properties

BACKGROUND

This activity is part of a series designed to help students develop classifying skills. It should follow Activities K.1.6 USING OUR SENSES and K.1.7 SAME AND DIFFERENT and precede Activities K.1.9 FUNCTIONS OF THINGS, K.3.4 LIVING AND NOT-LIVING, and K.3.5 ANIMALS AND PLANTS. Since it is a basic tool of science, classification will be revisited in succeeding levels of *DASH*.

PHYSICAL CHARACTERISTICS OF THINGS is also part of another series leading to the development of working definitions in Activity K.1.10 WORKING DICTIONARY AND WORKING DEFINITIONS. Activity K.1.8 may take more than one period to complete.

Properties

Earlier, the students were introduced to the concept of properties in Activity K.1.6 USING OUR SENSES where they described things they saw on the way to school. In Activity K.1.7 SAME AND DIFFERENT they identified different kinds of things in a master collection—lead pencils, rulers, and so forth and told how they were alike and different. Here in PHYSICAL CHARACTERISTICS OF THINGS the students use the same master collection and separate its items into other categories, using the physical properties of size, shape, color, and so forth. To do this they use a two-category or *dichotomous* system for sorting and classifying.

Two-category classification

Scientists use this same dichotomous system in their sorting and classifying. They inspect a collection of items and divide the collection into two categories. One category will have items with one or more defining properties that the items in the other category don't have. This

process of division continues until all items in a collection have been placed in distinctive categories. All items in a category have the same defining properties as all other items in it.

Student-Sorting Game

To give the students a feeling for how to classify, start with the Student-Sorting Game. Select four students and put them in the category *all students*. For example *all students* might be Jan, Jill, Jo, and Jack. Then divide *all students* into two categories—*Jan* and *not-Jan*. Next divide the *not-Jan* students into two more categories—*Jill* and *not-Jill*. Continue the process until *Jo* and *Jack* have their own separate categories. See Fig. K.1.8(1).

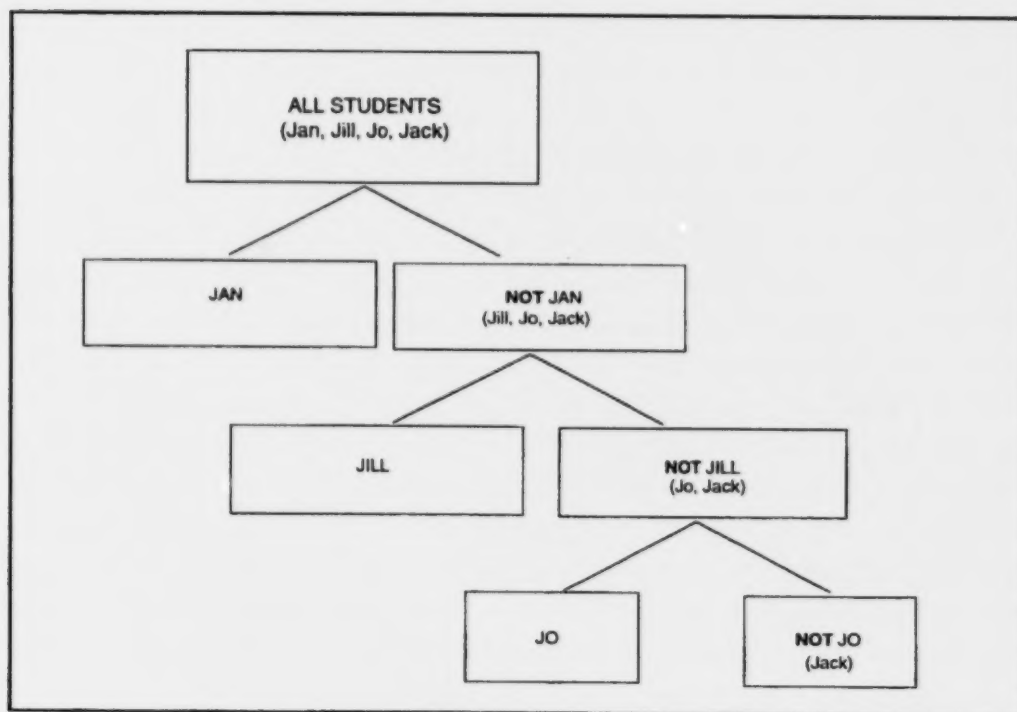


Fig. K.1.8(1) A classification tree showing the steps in the classification of students in the *Student-Sorting Game*.

Item-Classification Game

A second game, the Item-Classification Game, uses the items from the master collection put together for Activity K.1.7 SAME AND DIFFERENT and has the students classify items by their physical properties. Work with the students through the classification of at least one of the major categories such as *all pencils*.

Follow the process used in the Student-Sorting Game. On a table or the floor put all the items in a single major category. *All pencils* is the major category in Fig. K.1.8(2). The items listed reflect only one example of pencils that could be in the major category *all pencils*. Successively, the category *all pencils* is divided into *white pencils* and *not-white pencils*. Then the *not-white pencils* category is divided into two more categories—*yellow pencils* and *not-yellow pencils*. Again continue the division until the items can no longer be separated.

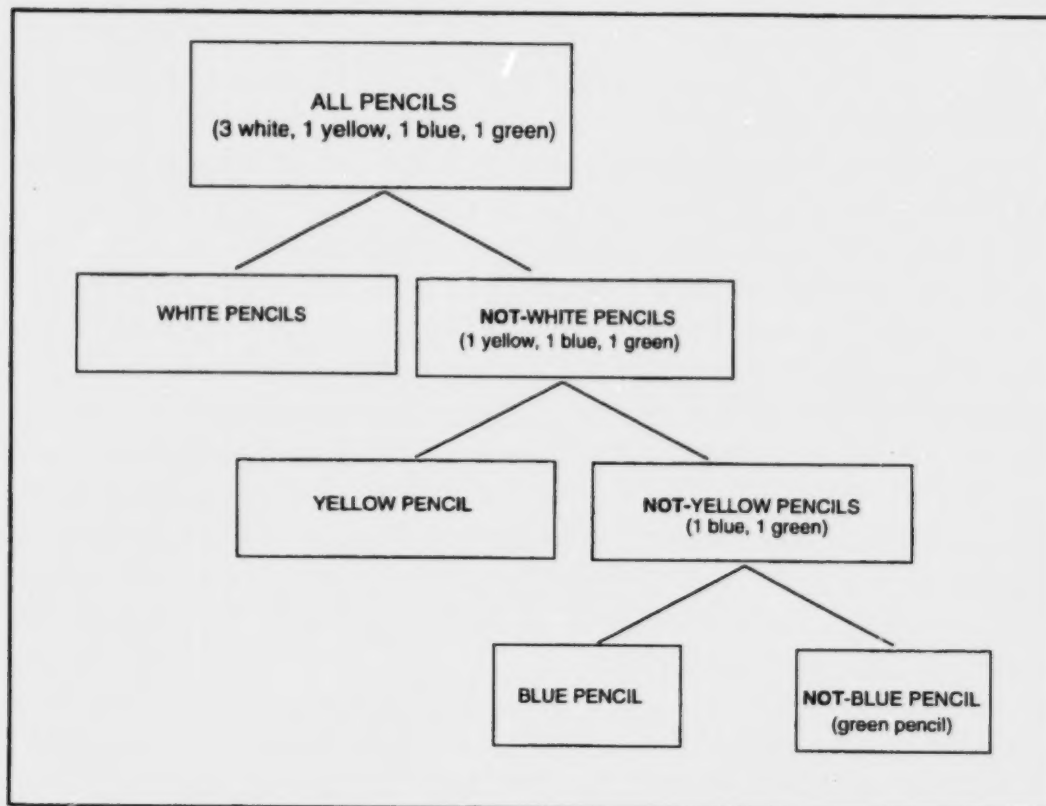


Fig. K.1.8(2) Classification tree showing the steps in the classification of pencils.

At each step leave a record of the categories to show what was done. To record the steps, draw a box or circle around the categories and give them names such as *all pencils*, *white pencils*, *not-white pencils*, and so forth. To help the students remember the categories, logos can be used in addition to words. For example, a series of lines might be the logo for *all pencils*, a white line for *white pencils*, a white line with a black diagonal line through it for *not-white pencils*, and so forth.

After one or two rounds of the game, have the students work in small groups to classify items in other major categories.

Showing steps in the classification

The students are asked to draw lines between the category boxes in the various games to show the sequence of steps they go through in their classification and create a classification tree. They use Student Page K.1.8 CLASSIFICATION TREE to record a classification tree showing the steps in one of the games.

Timing

This activity may take more than one day.

STUDENT ROLES

Taxonomist
Classifier

MATERIALS

chalk to write on floor
chart paper
markers
master collection of items from Activity K.1.7 SAME AND DIFFERENT
Student Page K.1.8 CLASSIFICATION TREE

PRODUCTS

Classification trees
Completed Student Pages

PROCEDURES

1. Have the students play the Student-Sorting Game.

- Draw a large circle on the floor and give it the name *all students*.
 - ✓ Ask for volunteers and select 4.
 - ✓ Have the 4 students write their initials in the circle and then stand in it.
 - ✓ Announce that this is the *all students* circle and label the circle.
- Draw another circle outside the big circle. Put the initials of student #1 in the circle.
 - ✓ Ask, Who is student #1?
 - ✓ Have student #1 stand in the circle and announce that this is *student #1's* circle.
 - ✓ Ask whether the original *all students* circle still has the right name now that student #1 is not in it.
 - ✓ Work to the idea that we need a new circle that doesn't include student #1.
- Draw a *not-student #1 circle* at the side of the *student #1 circle*. (See Fig. K.1.8(1). Have the remaining students put their initials in the new circle and stand in it.
 - ✓ Ask, What circle is this?
 - ✓ Work to the response that it is the *not-student #1 circle*.
- Draw another circle below the *not-student #1 circle*. Put the initials of student #2 in the circle.
 - ✓ Ask, Who is student #2?
 - ✓ Have *student #2* stand in the circle and announce that this is *student #2's* circle.
 - ✓ Ask whether the *not-student #1 circle* still has the right initials now that *student #2* is not in it.
 - ✓ Work to the idea that we need a new circle that does *not* include *student #2*.

- Draw a *not-student* #2 circle at the side of the *student* #2 circle. (See Fig. K.1.8(1). Have the remaining students put their initials in the new circle and stand in it.
 - ✓ Ask, What circle is this?
 - ✓ Work to the response that it is the *not-student* #2 circle.
 - Continue the process until all four students have their own category circle. See Fig. K.1.8(1).
2. **Repeat the steps in the sorting with other students. Ask the original group of 4 students to help others.**
 3. **Make a classification tree by drawing lines to show the sequence of steps in the sorting of students. See Fig. K.1.8(1).**
 4. **Help the students apply the classification technique to sorting the items in one of the major categories in the master collection from K.1.7 SAME AND DIFFERENT. Introduce the Item-Classification Game. See Fig. K.1.8(2) for an example using pencils. Place all items on the table and go through the classification with the students. Box in or circle all categories to record the steps in the process as in the Student-Sorting Game.**

Ask such questions as these:

- How did you separate one category of things from another?
 - ✓ Work to the idea of using different properties of items.
 - What kinds of properties did you use?
 - ✓ Get at such things as differences in shape, color, materials, weight, size, and others.
 - ✓ Give these things the name *physical properties*.
 - How is this classification similar to the Student-Sorting Game?
 - ✓ Get at the idea that they are the same except that one uses people and the other uses common classroom tools.
 - What other things do we sort?
5. **Organize the class into teams of 4-5 students. Give each team one of the major categories of the master collection from K.1.7 SAME AND DIFFERENT. Help them play the Item-Classification Game.**

Have the students do the following:

- Divide their major category into two new categories so that the items in one new category have one or more properties that the items in the other category do not have.
- Draw boxes and create identifying logos to represent the categories of items.
- Continue the subdivision as far as possible.

6. **Help the students record a classification tree from one of their games on Student Page K.1.8 CLASSIFICATION TREE. Have them put logos in the boxes and draw lines to show the steps.**
-

EXTENSION

- Put a collection of four or five books on a learning center table and have a different group of students reclassify them in a different way each day. Identify each book with a logo.
 - ✓ Have the students draw a classification tree and post it at the center to show how their classification is different from those done previously.
 - ✓ At the end of each day have the students report on their classification and the properties they used.



K.1.9 FUNCTIONS OF THINGS

OBJECTIVES

The students

- identify functions of items
- classify items by their functions

BACKGROUND

FUNCTIONS OF THINGS usually follows Activities K.1.6 USING OUR SENSES, K.1.7 SAME AND DIFFERENT, and K.1.8 PHYSICAL CHARACTERISTICS OF THINGS and precedes Activities K.1.10 THE WORKING DICTIONARY AND WORKING DEFINITIONS, K.3.4 LIVING AND NOT-LIVING, and K.3.5 ANIMALS AND PLANTS.

In FUNCTIONS OF THINGS the students use the property of *function*, what a thing is used for or does, to classify items in the master collection of items from Activity K.1.7 SAME AND DIFFERENT.

Function Game

Classification is like a puzzle with several solutions. In practice rounds of the Function Game the students work with the teacher to develop an idea of *function*—what a thing does or is used for. Together they classify items based on their functions using the same techniques worked out when they classified things by their physical characteristics.

In the practice rounds the game is played with one item from each of four of the major categories of items from the master collection from Activity K.1.7 SAME AND DIFFERENT. The items are put on a table, and the students find a function that will fit all of them. For example, for a collection of a lead pencil, ruler, paper clip, and sheet of paper the function name could be *things used in school*. The students would then divide the collection into a pair of categories, labeling one category as having a particular function and the other as not having it. For example, *a thing used to measure inches and centimeters* (a ruler) and *things not used to measure inches and centimeters* (all other items) might be suggested. Logos as well as words can be used. To represent the function, a hand can be added to the logo for the item. See Fig. K.1.9(1).

Item	Functions	Suggested Logos
Book	To read, to hold printed words and pictures	Book with a hand
Crayon	To color or make into candles	Crayon with a hand
Paper	To write on or to fold into paper airplanes	Paper with a hand
Paper clip	To hold paper together or to weight a string	Paper clip with a hand
Lead pencil	To write on paper or to punch holes	Pencil with a hand
Ruler	To measure distance or draw lines	Ruler with a hand

Fig. K.1.9(1) Some examples of functions and suggested logos

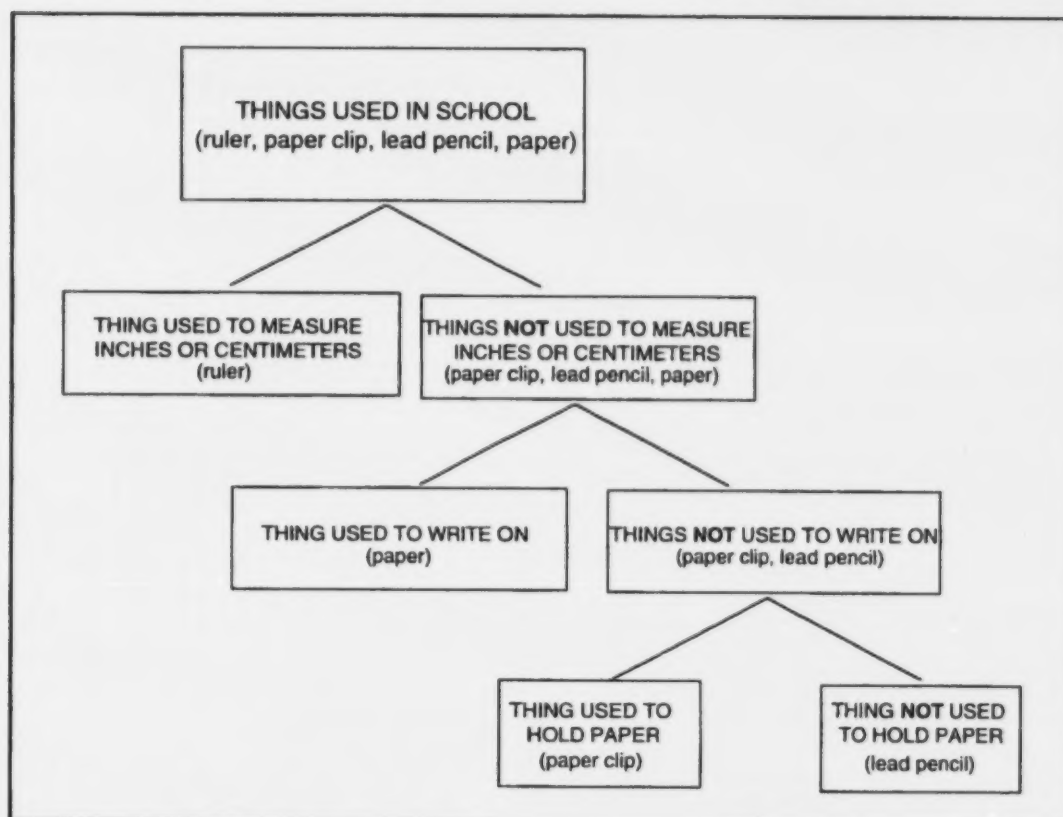


Fig. K.1.9(2) Sample classification tree from the Function Game

After one or two practice rounds, the students are provided with single items from four major categories of the master collection. They work in teams of 4 or 5 students to create function categories that allow them to sort the items as they did in the practice rounds.

STUDENT ROLES

Taxonomist
Classifier

MATERIALS

chart paper
master collection of items from Activity K.1.7 SAME AND DIFFERENT
Student Page K.1.9 FUNCTIONS OF THINGS

PRODUCTS

Classification tree about function
Completed Student Pages

PROCEDURES

1. **Use the master collection of items from K.1.7 SAME AND DIFFERENT to play one or two practice rounds of the Function Game with the class. Put four items from four different major categories on chart paper.**

Ask such questions as these:

- What can all these items be used for?
✓ Get at such things as they could be uses as classroom tools, as tools in an office, and as things to make other things.
- Does anyone know a word that means the *use of things*?
✓ Take students' suggestions and work to the idea of *function*.
✓ Draw a box or circle around the items and label the collection with a common function.
✓ Create a logo for the function and put it in the box or circle. A hand added to a logo can represent function.

- Can you divide these things into two categories so that things in one category have a special function and things in the other category do not have that function?
 - ✓ Discuss possible divisions. If the students don't come up with an idea, suggest one yourself.
 - ✓ Draw boxes or circles around the categories and help the students identify them with functions and logos.
 - ✓ A logo for the *not-used* category can be the *used as* category logo with a diagonal line through it as in no smoking signs.
 - ✓ Continue the subdivision until each kind of item has its own labeled function box.
 - Can someone show us the steps you have gone through?
 - ✓ Help the volunteer draw lines between the boxes or circles, creating a classification tree of functions.
- 2. Organize the class into teams of 4 or 5 students. Give each team 4 items (one item from four different major categories) and a sheet of chart paper on which to draw their classification tree showing the steps they have gone through. Have them play the Function Classification Game.**

Help the students do the following:

- Give their total collection a function category name.
 - ✓ It may be the same as the one used in the practice round.
 - Divide their collection into function categories as in the practice round and draw boxes or circles around each category.
 - Identify the different functions with logos.
 - Continue the subdivision until each item has its own function category.
 - Create a classification tree by drawing connecting lines to show the steps.
- 3. Summarize the games.**

Ask such questions as these:

- Where have you seen a tree like the one you have just created before?

✓ Bring out the classification trees from Activity K.1.8
PHYSICAL CHARACTERISTICS OF THINGS.

- How are these trees alike?
 - ✓ Get at the idea that they all show the steps used to sort or classify items by putting them into categories.
- What are some things we sort by function?
 - ✓ Get at such things as toys or our clothes (shirts, tee shirts, sweaters, coats, and so forth).

4. Have the students complete Student Page K.1.9 FUNCTIONS OF THINGS.

EXTENSION

Start a Functions Chart:

- Tape an object such as a pencil on chart paper and each day have a student suggest a different function that the pencil can have.
 - ✓ Have the student draw a logo to show the function. (Logo drawing can make an exciting art lesson.)
 - ✓ To stretch the imagination of the students, add a function yourself. This might be to punch holes in paper, to use as a temporary bookmark, and so forth. An automatic pencil with a clip might be used as a temporary paper clip.



K.1.10 THE WORKING DICTIONARY AND WORKING DEFINITIONS

OBJECTIVES

The students

- practice making working definitions
- start to compile a working dictionary

BACKGROUND

THE WORKING DICTIONARY AND WORKING DEFINITIONS draws together work from Activities K.1.6 USING OUR SENSES, K.1.7 SAME AND DIFFERENT, K.1.8 PHYSICAL CHARACTERISTICS OF THINGS, and K.1.9 FUNCTIONS OF THINGS. The Working Dictionary is one of the devices used in DASH to keep records of learning progress. Other record-keeping devices include the Learning Calendar, the Science Record Book, the Wonder and Discover Book, the Connections Book, and the Concept and Skill Inventory.

Working definitions

Scientific progress relies on *operational* or *working definitions* that describe scientists' current understanding of concepts or terms. These definitions are called "working definitions" because they allow the work of science to go on. It is understood that such definitions may be changed or modified in the future.

Students' definition

Research on children's development of definition indicates that the ideas they have about the world are constantly changed or modified by experience. DASH has called on these findings for guidance and therefore uses working definitions to support the students' continual shaping and reshaping of concepts and ideas.

A record of working definitions gives students a way to keep track of their evolving thinking. Working definitions provide teachers with a window into the students' grasp of ideas. There should be a review of previous definitions whenever already-defined concepts reemerge. Definitions can be added to or changed in the review process.

Focus Book

The Focus Book *The Friendly Shape* can be used to give the students a sense of working definitions. In the story an imaginary spaceship lands on a planet and finds different things that have the same rectangular form it has. It also finds functions that help give these rectangular objects their definition.

Spaceship's model definitions

In *The Friendly Shape*, the spaceship creates working definitions for objects that it encounters. In its definitions the spaceship includes a *category name* (bus, TV, theater, and so forth); the object's *functions*, what it does or what its uses are; and its *forms*. *Forms* involve the *physical properties* of things such as their shape, size, and sensory properties (color, texture, sound) and the *materials* and *parts* of which the things are composed. Working definitions in *DASH* are developed around the basic model of the spaceship's definitions. For example, the spaceship says a *bus* (name) is a *rectangular object* (form) that has *wheels and windows* (form) and *carries people* (function).

Evolving definitions

Beginning working definitions may include only a category name and the thing's functions; for example, *living things* grow, reproduce, and use water or need water. Just as commonly, a beginning working definition may include only a category name and the thing's forms; for example, *living things* are made of wood or meat. A more advanced working definition would join these pieces: *Living things* (category name) are made of wood or meat (forms) and grow, reproduce, and use water (functions). Beyond this simple model, a maturing working definition might also include examples, synonyms, pictures or diagrams, and other information. Pictures and drawings in particular greatly enhance deeper understanding of a working definition.

The Working Dictionary

The Working Dictionary is most often a book with blank pages, frequently in loose-leaf or big-book format. It is used to keep a record of definitions. It is suggested that a single page be devoted to each concept or term defined so that ideas can be added or changed. Entries should be dated. Initials of major contributors can be added to help you in assessment of students' understanding. Working definitions might include incorrect information until they undergo the regular reevaluation when corrections can be made. This is how science operates—it is always growing and refining and sometimes changing its ideas.

Illustrating the dictionary

Only a few kindergarten students will be able to read or enter definitions in the Working Dictionary. Usually you will need to keep the record and read it to the students when definitions are needed. If the students illustrate the dictionary, it will help them find and remember the definitions.

STUDENT ROLE

Lexicographer

MATERIALS

Focus Book *The Friendly Shape*

chart paper

markers

Student Page K.1.10 WORKING DEFINITIONS

PRODUCTS

Working Dictionary

Completed Student Pages

PROCEDURES

1. Read and discuss the Focus book *The Friendly Shape*.

Ask such questions as these:

- What was the shape of the spaceship?
- Why did the spaceship say it liked the planet?
- Why did the spaceship think it knew all about the planet?
- In what ways are the bus and spaceship the same or alike?
- In what ways are the bus and spaceship different or not alike? What are the differences?
- What can the bus and spaceship do that are the same?
 - ✓ Use the term *function* to tell what a thing does or is used for.
- What functions of the bus are different from the functions of the spaceship?
- According to the spaceship, what is a bus?
 - ✓ Repeat what the spaceship says about the bus.
 - ✓ The bus is a rectangle that carries people.
 - ✓ Point out that this is the spaceship's *working definition* for a bus.

2. Help the students tell how the spaceship defines or tells what a thing is. Its working definitions include a *name* (bus, TV, lunch box, and so forth), a *function* (what the thing does or how it is used), and its *form* or shape and other properties.

Ask such questions as these:

- What does the spaceship call the things that it meets?
 - ✓ Work to the idea that it calls them by their names—bus, theater, TV, lunch box. These are kinds or major categories of things.

- ✓ Write the word *name* or *category* on the board.
 - What does it say about what they do or are used for?
 - ✓ Review what the spaceship says about the function of the different things.
 - ✓ Write the word *function* on the board.
 - What does it say about the form or shape and other properties?
 - ✓ Review what the spaceship says about shape and other properties.
 - ✓ Write the word *form* on the board.
3. **Have the students use the rectangles on Student Page K.1.10 WORKING DEFINITIONS to draw a picture of an object from its working definition.**

The following are some suggested working definitions:

- The object is box-shaped, has drawers, and you put clothes in it.
 - ✓ Ask what object they have drawn (a dresser).
 - The object is rectangular, has lines and three holes on one side, is made of paper, and you can write on it.
 - ✓ Ask what object they have drawn (a piece of notebook paper).
 - The object is box-shaped, has a door, and you put dirty dishes in it to be washed.
 - ✓ Ask what object they have drawn (a dishwasher).
 - The object is rectangular, has a pattern on it, and is used to cover a bed.
 - ✓ Ask what object they have drawn (a quilt, blanket, or sheet).
4. **Have the students make new drawings. Have them show their drawings and ask the class to define the objects drawn.**

Help them include the following in their working definitions:

- Name of the object.
 - Function—what it does or is used for.
 - Form—its appearance.
5. **Introduce the Working Dictionary to the students by creating a working definition for a word, term, or concept. Include the kind or category name, functions, and forms of the thing defined and one or two drawings.**

6. At the end of the school year store the Working Dictionary in the library for the students to build on next year.
-

EXTENSION

- Have the students write their own class story about the continuing adventures of the "working definition" spaceship.



K.1.11 THE WONDER AND DISCOVER BOOK

OBJECTIVES

The students

- keep a record of questions they are wondering about
- keep a record of discoveries they make about their questions

BACKGROUND

The Wonder and Discover Book is one of the devices used in *DASH* to keep records. Others include the Learning Calendar, the Science Record Book, the Working Dictionary, the Connections Book, and the Concept and Skill Inventory. Of these, the Wonder and Discover Book is unique in cataloging the students' unanswered questions.

Role of questions

Questions are vital to *DASH*. Questions asked by the students can give the teacher insight into the thinking processes and concept development of the students. While answers for most questions will come out of the immediate activity, some will spill unanswered over its boundaries. This is where the Wonder and Discover Book comes into play, providing a mechanism to keep a record of unanswered questions that are worthy of later attention.

Using the Wonder and Discover Book

When a student asks a question that is not part of the current activity, give recognition to its value. To prevent a break in the class flow, make a quick note so you can record the question later on a new page in the Wonder and Discover Book along with the student's name and the date. The student's illustration can be attached to the question.

Answering the question

When any student finds something about a Wonder and Discover question or thinks of an answer, record it on the same page as the question along with the date of the discovery and the initials of the student with the idea. This process can continue as long as the students

pursue a question. One question per page allows the recording of multiple student ideas and answers. Additional pages can be added. Use of the Wonder and Discover Book gives you time to find materials to help answer questions.

When to start the Wonder and Discover Book

The Wonder and Discover Book can be used from the beginning of school when a student first asks a question that deserves to be thought about. Its regular use shows students that their questions are important. It will be helpful to have the book made up ahead of time in anticipation of the first Wonder and Discover question.

Unanswered questions

Some questions may not be answered during the course of the school year. These can be passed on so the first-grade teacher can continue the students' self-initiated inquiries. The students' unanswered questions should be available to all first-grade DASH teachers who receive students from you. Keep the original Wonder and Discover Book in the library as a primary reference. If possible, pass on photocopies.

STUDENT ROLES

Students
 Researcher
 Scientist
 Technologist

MATERIALS

paper for book
 markers
 cover material for the book
 Student Page K.1.11 WONDER AND DISCOVER BOOK QUESTIONS

PRODUCTS

Wonder and Discover Book
 Completed Student Pages

PROCEDURES

1. **When students ask questions that you don't want to or can't deal with in the current lesson or they should try to answer on their own, introduce the Wonder and Discover Book.**

- Note the importance of each question when it is asked.
✓ Make a quick note of the question.
 - As soon as possible, ask the student to repeat the question to put it in the Wonder and Discover book.
 - Record the student's question, name, and date.
 - Explain how the book will be used.
 - Have the students draw pictures about their questions to remind them of what they have asked.
✓ Attach the pictures with the questions.
2. **Review the Wonder and Discover Book periodically and ask for and record answers and ideas along with the name of the student author or inventor of the idea and the date.**
 3. **At the end of the year, have the students copy their personal unanswered questions on Student Page K.1.11 WONDER AND DISCOVER BOOK QUESTIONS. When possible, duplicate pages with unanswered questions and pass them on to first-grade DASH teachers receiving your students. Put the original book in the library.**

EXTENSIONS

- Use unanswered questions as homework research questions.
- At the end of the year go over the Wonder and Discover Book to remind the students that there still are answers to look for during the summer.
- Enter unanswered questions or questions undergoing active research on a computer file to pass on to the *DASH 1* teacher.



K.1.12 CONNECTIONS

OBJECTIVES

The students

- find connections between what they are learning in school and what they are learning at their home and in the community
- find connections between the things they are learning in school

BACKGROUND

The Connections Book is another of many devices used in *DASH* to keep records. Others include the Learning Calendar, the Science Record Book, the Working Dictionary, the Wonder and Discover Book, and the Concept and Skill Inventory. Of these, the Connections Book keeps a running log of student understanding of the ways concepts and skills are connected to things already known and things learned inside and outside school. In *DASH K* it is usually a picture book with connecting words relating things, events, and people.

Initial use of the Connections Book can be time-consuming. Therefore, it is suggested that at the kindergarten level it be used in schools where *DASH* is the organizing focus of the curriculum. The Connections Book will be used at all other levels but may be omitted in *DASH K*.

Function of the Connections Book

Often students have a difficult time associating what they are learning in school to their home and to other outside-of-school environments. The purpose of the Connections Book is to provide a stimulus to look for connections, relationships, and applications. Particularly in the early years, beware of overuse. Connections can also be made on the Learning Calendar and in the Working Dictionary.

When to start the Connections Book

The Connections Book can be introduced anytime the students seem to have a fairly good grasp of a concept of such things as pets or responsibility. Ask the students how the concept is connected to other things they have done or seen in or out of school. If, for example, the concept of pets is the focus of discussion, the students might connect pets with feeding, watering, exercising, playing with, grooming, and

cleaning their pets at home. This is also a time to make connections with the world of work—the pet care industry, sales, veterinary medicine, and so forth. It is a time to ask who uses or needs to know about the things we have studied. The Connections Book can be used throughout the year whenever new concepts and skills can be related to the students' broader world.

Reviewing the Connections Book

The Connections Book should be reviewed periodically. This allows students to add connections they have found between *DASH* concepts within the different clusters, with other subject areas, and with things outside school. This review activity can be the basis for fascinating illustrated stories.

Home involvement

Student Page K.1.12 HOME CONNECTIONS is designed to involve parents in helping their children make connections between things learned in school and things learned outside school. Encourage parents to add written descriptions to the students' drawings. When students make connections, have them bring in their HOME CONNECTIONS Student Pages and give them replacement pages to take home. The pages can be added to the class Connections Book or to their Science Record Books.

Storing the Connections Book

Ideally the class Connections Book will be stored in the library at the end of the school year so that teachers and students will have access to it in *DASH 1*.

STUDENT ROLES

Commentator
Philosopher

MATERIALS

chart paper
markers
oak tag
Student Page K.1.12 HOME CONNECTIONS

PRODUCTS

Connections Book
Completed Student Pages

PROCEDURES

1. **Discuss the Connections Book with students using a concrete example of connected ideas, for example, responsibility.**

Ask such questions as these:

- Where else besides school do you have responsibilities? What are they? How are they like your responsibilities at school?
- Who else has responsibilities? Do people who work in the fire department, police department, hospital, and so forth have responsibilities? What are their responsibilities? How are they like your responsibilities at school?

2. **Help the students draw pictures showing their connections and add whatever language is needed to describe the connections. Be sure the student's name and the date are on each contribution. Put the drawings in the Connections Book.**

3. **Help the students review and add to the Connections Book periodically.**

Ask such questions as these:

- Has anyone discovered any more ways that the ideas we already have recorded can be used? Who are the people who use these ideas this way? What are they?
- Are there other ideas we should put in the Connections Book? What are they?

4. **At the end of the school year store the Connections Book in the library as a resource for DASH 1 teachers and students.**
-

EXTENSION

- Use Student Page K.1.12 HOME CONNECTIONS to involve parents in helping their children make connections between things learned in school and their application outside school.



K.1.13 FAMILIES

OBJECTIVES

The students

- identify persons they regard as family members
- identify different family patterns
- practice using the relationship names to identify family members

BACKGROUND

FAMILIES is the first of a series of activities on interpersonal interaction. The series starts with the home then focuses on school and friends. It is part of the mental health component of *DASH*. It is usually followed by Activities K.1.14 FAMILIES AND HELPING, K.1.15 MAKING FRIENDS, K.1.16 BEING FRIENDS, and K.1.17 SCHOOL AND HOME.

Family structures

Families are the fundamental unit of society. However, the traditional stereotype of mother, father, and two children is less and less common. Children need to learn that although families come in many patterns, all are still families.

Activity approach

This activity, in a non-invasive way, has the students use drawings to show their concept of a family, usually the family they call their own. Understanding something about students' perception of their family provides insight into how to communicate with the students and their families as well.

When to use the activity

Since FAMILIES is the starting point of activities focusing on interpersonal relationships, it is usually best done early in the school year. The information gained from this activity may be helpful to you as you prepare for parent conferences.

STUDENT ROLE

Biographer

MATERIALS

crayons, markers, or pencils
 Working Dictionary
 Student Page K.1.13 FAMILIES

PRODUCTS

Working definition of family
 Completed Student Pages

PROCEDURES

1. **Help the students draw pictures of a family on Student Page K.1.13 FAMILIES. The pictures may or may not be labeled.**

2. **Discuss different family patterns.**

Ask such questions as these:

- Who are the people in your family?
- Does anyone else have a family like this?
- Does anyone have a family with only two people? Who are they?
 ✓ Get at relationship names such as mother, father, aunt, grandparents, and so forth.
- Does anyone have a family with three people? Who are they?
 ✓ Continue to ask for the different numbers and family members.
- Are all families alike?
- How do families differ?
- What do we mean by the word family?

3. **Help the students develop a working definition of family and record it in the Working Dictionary. The definition can be developed after the dictionary has been put into use. This definition lends itself to extensive illustration.**

EXTENSIONS

- Help the students expand their concept of family to include relatives who live in other places.
- Have the students tell about the people in their parents' families.
- Use this activity to help the students begin compiling books about their families.



K.1.14 FAMILIES AND HELPING

OBJECTIVES

The students

- identify family helping relationships
- identify things that they need want to learn to do

BACKGROUND

FAMILIES AND HELPING is part of the mental health component of DASH. It is usually preceded by K.1.13 FAMILIES and followed by K.1.15 MAKING FRIENDS, K.1.16 BEING FRIENDS, and K.1.17 SCHOOL AND HOME.

Helping and responsibility

Family members have different responsibilities. They depend on each other to fulfill those responsibilities. Children usually perceive the carrying out of responsibilities at home as helping. This activity is designed to have the students think about the help they receive and what they can learn to become more independent. It sets a learning agenda. This idea of helping oneself and others is transformed into personal goal setting in later grades.

Structure of the activity

Because their writing skills may be limited, the students are asked to draw pictures or logos to show ways they are helped and ways they can help others. This not will give a full inventory of help, but will provide a basis for discussion. A class logo chart of things done in helping may be useful.

STUDENT ROLES

Observer
Recorder

MATERIALS

crayons or markers

Student Pages K.1.14A WHO HELPS ME?
 K.1.14B PEOPLE I HELP
 K.1.14C THINGS TO LEARN TO DO

PRODUCTS

Completed Student Pages

PROCEDURES

1. **Help the students invent and draw pictures or logos representing the kinds of things people in their family do to help them.**

Ask such questions as these:

- What do people in your family do to help you?
- Who prepares your meals? What might a logo to show this look like?
 - ✓ Any item of food could be used.
 - ✓ Common logos will save time.
 - ✓ A class logo chart can be made for the students to follow.
- Who helps you get dressed? What might a logo to show this look like?
 - ✓ Any item of clothing could be used.

2. **Help the students complete Student Page K.1.14A WHO HELPS ME?**

Help them do the following:

- Draw pictures of people in their family who help them.
- Draw logos or pictures next to the drawings of the people in their family to show the kind of help they give.

3. Discuss the students' drawings.

Ask such questions as these:

- Who helps you the most?
- What kinds of things do you need the most help with?

4. Invent and draw logos representing the kinds of things the students do to help people in their family. Add these to the class logo chart.

- What do you do for other family members?
- How can we show that with a logo or drawing?

5. Help the students complete Student Page K.1.14B PEOPLE I HELP.

Help them do the following:

- Draw pictures of people in their family that they help.
- Draw logos that show the kinds of help they give to the people they have drawn.

6. Discuss the students' drawings.

Ask such questions as these:

- Whom do you help the most?
- What kinds of things do you help with most often?

7. Help the students invent and draw logos or pictures to represent the kinds of things they want to learn to do for themselves. Help them complete Student Page K.1.14C THINGS TO LEARN TO DO.

8. Discuss the students' drawings.

Ask such questions as these:

- What would you like to learn to do for yourself?
- What would you like to do for others?

- How is helping at home like a responsibility at school?
 - What is a responsibility?
- 9. Help the students create a working definition of responsibility and record it in the Working Dictionary. A definition can be developed whenever the dictionary has been introduced.**
- This can be richly illustrated with examples.
-

EXTENSION

- Have the students ask their parents and grandparents what they did for themselves and others at the students' age.



K.1.15 MAKING FRIENDS

OBJECTIVES

The students

- learn the names of class members
- learn about members of the class

BACKGROUND

MAKING FRIENDS is part of the mental health component of *DASH*. It may be preceded by Activities K.1.13 FAMILIES and K.1.14 FAMILIES AND HELPING and followed by K.1.16 BEING FRIENDS and K.1.17 SCHOOL AND HOME.

Approach

Friendship is very important to school-age children. It requires skills that must be learned and practiced. MAKING FRIENDS begins with the reading of the Focus Book *Same and Different* where two friends talk about liking and doing the same things. The class then plays some name games to introduce everyone and learn some background about each person in the class. Learning about a person, particularly the person's name, is an important starting place for friendships.

Portrait gallery

A portrait gallery helps make each student's face, name, and initials available to the class at all times. The posting of pictures with spelled-out names and the regular pronunciation of those names in class provide reinforcement of phonic patterns. The addition of initials gives the students control of symbols that can be learned quickly and used to identify personal contributions to the class. Have the students bring in pictures, school photos if available, or take them yourself if you prefer.

Focus Book

The Focus Book *Same and Different* is used here and in Activity K.1.7 SAME AND DIFFERENT. This helps to strengthen the idea that books we read or things we see can have multiple uses.

When to use the activity

MAKING FRIENDS is usually done about the middle of first semester after the students have begun to get acquainted. This gives the students a chance to master names. The activity may be used earlier to help create a community spirit in the class.

STUDENT ROLE

Friend

MATERIALS

Focus Book *Same and Different*
pencils
photos of students
Student Page K.1.15 FRIENDS

PRODUCTS

Completed Student Pages

PROCEDURES

1. Read and discuss the Focus Book *Same and Different*.

Ask such questions as these:

- Are the students in the story friends?
- Why do they like each other?
- How do you suppose that they know so much about each other?
- How could we learn to know something about each other?

2. Play Game 1, Introductions.

- Have partners talk to each other, sharing names, birthdays, things they like to do, and so forth.
- Have partners introduce each other to the rest of the class.

- Have the introducers recite their partner's name and lead the class in greeting the student.
✓ Help the introducers use the name you use in class.
 - Have the introducers share several things about their partners.
- 3. Make a portrait gallery for class identification purposes.**
- Get a photo of each student.
✓ The students might mount their own portraits as an art activity.
 - Write the students' names and initials beneath the pictures.
✓ The teacher should do this to ensure consistency in lettering.
- 4. Play Game 2, Who Is It?**
- Describe a student without telling the name and have the students try to guess who it is.
✓ This game can be played many times. In the beginning you can do the describing. Later have the students take over.
- 5. Have the students collect the autographs of all students in the class on Student Page K.1.15 FRIENDS.**
- Have the students first collect initials.
✓ This will provide an opportunity to reinforce the writing of letters.
 - Later have the students collect first names and then whole names.

EXTENSION

- Have the students collect autographs, ages, and other information from children outside their classroom.
✓ On autograph days the students might carry a card with their favorite color, animal, or holiday that can be shared and copied.



K.1.16 BEING FRIENDS

OBJECTIVES

The students

- make puppets
- practice resolving conflicts through acting out open-ended scenarios with puppets

BACKGROUND

BEING FRIENDS is part of the mental health component of *DASH*. It usually follows Activities K.1.13 FAMILIES, K.1.14 FAMILIES AND HELPING, and K.1.15 MAKING FRIENDS and precedes K.1.17 SCHOOL AND HOME.

Activity approach

Being a friend involves a variety of skills that must be learned and refined throughout life. A critical set of skills involves resolving conflicts with friends. Kindergartners have enough experience to suggest adequate ways of resolving and preventing many conflicts. You can suggest other ways as needed. Inherent in this activity is a start on learning general conflict prevention and resolution skills.

Puppets as actors

By using puppets as antagonists in playlets the students can explore ways to resolve common conflicts. A student audience with or without puppets can offer alternatives to the resolutions offered by the actors in a playlet.

Actual conflicts

Puppets can also be very effective in resolving actual conflicts. The puppet can tell the story of an incident with some degree of distance so that facts and emotions are brought out without direct threat to self-image.

Making a puppet

Bag puppets, stick puppets, and sock puppets are easily and quickly made. Lunch bags and old socks can be recycled in this way. Features can be drawn with colored marking pens, making an enjoyable art lesson. See Fig. K.1.16.

When to introduce the activity

This activity is best done after the students know each other and some conflicts have arisen.

STUDENT ROLES

Friend
Puppeteer
Actor

MATERIALS

lunch bags or old socks
marking pens
index cards
Popsicle sticks
glue
Working Dictionary

PRODUCTS

Puppets
Working definition of friend

PROCEDURES

1. **Help the students make bag, stick, or sock puppets. A classroom puppet collection can also be used.**
2. **Help the students use puppets to resolve some fictional problems. This initially can be modeled with the teacher and a selected or volunteer group of students. Help the students concentrate on solving problems as friends.**
 - Present a problem scenario.
 - ✓ This can be done with a teacher-operated puppet.

- Have the students act out the scenario using their puppets.
- Have the students share their solutions using their puppets.

3. A scenario could include any of the following situations or one that the teacher feels needs attention.

One or more of the following situations might be used:

- Several students are arguing over who will get to use a jump rope next, a slide, a ball, and so forth.
- Students are arguing over who knocked over a jar of water.
- Students are arguing over whether a ball was foul.

4. Discuss solving problems in the classroom as friends solve problems.

Ask such questions as these:

- What do we do when a friend needs help?
- What can we do when a friend wants use the same swing we want to use?
✓ Get at taking turns.
- What can we do when two people need the same bottle of glue?
✓ Get at sharing.

5. Have the students resolve a real friendship problem using puppets when such a situation arises in the classroom. This technique works best when only the students in conflict and the teacher are present.

The following suggestions might be helpful:

- Have the students involved in an interpersonal problem sit at a table facing each other. The teacher acts as a facilitator.
- Give each student a puppet.
- Have each puppet take a turn to tell what has happened.
- Give each puppet a turn to suggest a solution that friends would come to. Make sure each puppet has a chance to respond to the other puppets' suggestions.
✓ Help the puppets come to an agreed-upon resolution.

- Discuss what could be done differently next time so this problem doesn't happen again. Give each puppet a turn to suggest an approach and to respond.
 - Have the puppets act out the situation as it could occur between friends the next time.
 - ✓ The teacher's role decreases over time as the students become more proficient with the process.
6. **Have the students create a working definition of a friend and record the definition in the Working Dictionary when it is available.**
-

EXTENSION

- Have the students make a storage case for their puppets.

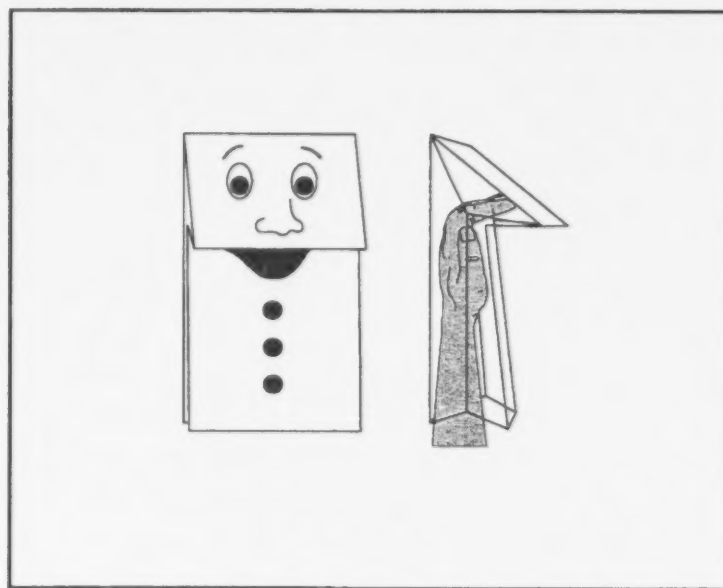


Fig. K.1.16 A bag puppet



K.1.17 SCHOOL AND HOME

OBJECTIVES

The students

- invent and make message pouches
- use the pouch to carry messages between home and school
- report school messages
- report home messages

BACKGROUND

In SCHOOL AND HOME the students begin to learn the art of being responsible for the information flow between school and home—they become messengers. They invent and make protectors for the messages they need to deliver. During the course of the year the pouches may wear out or get lost. The students should then invent and make new improved ones.

The Inventor's Box

This may be the first time that the students use an Inventor's Box, a container of materials to be used in creating their inventions. Put materials to be used in the box and allow the students to select what they need for their invention. Feel free to add items at the students' request.

Directions to students

When you send messages home, tell the students about the contents so they can practice verbal delivery of information. Ideally, the paper in the container will be only a validation of what they report. The central idea to get across to children is that both teachers and those responsible for them at home are concerned about their learning. Because of this concern you need to communicate with each other.

When to use the activity

The activity can be introduced whenever there is a message to be sent home. However, it is probably best used after the class has settled into a routine and bad weather is likely.

STUDENT ROLES

Inventor
Message pouch or container maker
Messenger

MATERIALS

resealable plastic bags
cloth, plastic, or freezer tape
string
paper punch
scissors
marking pens
Student Page K.1.17 MY MESSAGE LOG

PRODUCTS

Message pouches or containers
Completed Student Pages

PROCEDURES

1. **Tell the students that during the year they will need to take messages home.**

Ask such questions as these:

- Why might a teacher want to send messages to students' homes?
- Why might people in the students' families want to send messages to a teacher?
- Why is it helpful to have written messages?
- What can happen to pieces of paper that we hand-carry home?
- How can we carry messages so that they do not get torn?
- What might we do to keep the messages from getting lost?
- How can we keep our messages out of the rain and dirt?
✓ Work for the idea of using a pouch, bag, or other container.

- What might a message pouch look like?
 - What could you make a message pouch or container out of?
2. **Help the students invent message pouches. Provide an Inventor's Box with such things as resealable plastic bags; cloth, plastic, or freezer tape; string; a paper punch; other items as requested.**
 3. **When the students need to use the pouches, go over the message that is being sent home.**
 Ask such questions as these:
 - What does the message say?
 - Can you tell people at home what is in the message?
 - What do we need to go over?
 4. **Each time a message is sent home, have the students use Student Page K.1.17 MY MESSAGE LOG to record the date and whether they reported the message.**
 5. **If the message pouches becomes lost or worn, have the students invent new ones and improve on their design.**

EXTENSIONS

- Have the students make a list of people who are message carriers—postal personnel, news carriers, delivery people, and so forth.
- Invite one of these message carriers to class. Help the students make a list of questions to ask them. Help them include such things as how they keep their papers and boxes clean and dry, how they know where to deliver them, and where they get the things they deliver.



K.1.18 CONCEPT AND SKILL INVENTORY

OBJECTIVES

The students

- assess their own knowledge of concepts and skills
- receive comment on their assessment from the teacher

BACKGROUND

This activity involves the students in self-assessment, a new experience for most kindergartners. Self-assessment helps students become aware of their own knowledge and skills. Even young students have a reasonably clear understanding of what they do and do not know and what they can and cannot do.

Administering the assessment

The inventory takes about 30 minutes to administer. It is suggested that it be given at least twice during the year, usually at the end of each semester. It can be given in one or two sessions. The teacher will need to read the listed concepts and skills to the students. Dividing the class into sections may make administration easier. The assessment is not a guessing game, so help the students as needed.

Responses

The answers (*No/Yes*) can be circled, marked with Xs, underlined, or whatever. Other concepts and skills can be added to the inventory as appropriate.

Multiple uses of the same inventory

The same inventory sheets can be used more than once to show progress. The first inventory marks might be in blue with the second in red, or the first inventory marks might be circles, the second Xs. If the assessment is used more than twice, additional colors and marks can be used.

Use of explanatory language

When administering the Concept and Skill Inventory, the teacher should change the terminology of the script to match the language that was used in the classroom. For example, under *Skills* the first question, Do you know how to observe something? might be read, Do you know how to watch to find out what a rabbit or a floating bubble does? See the suggested script.

The teacher assessment

Teacher assessment of a student's development of concepts and skills can be done using the same inventory. Determine whether you agree with the students' responses. Where there is a difference, for example, a *yes* where you feel the response should be *no*, check to see whether the student's perception is accurate by having the student *teach* you the concept or *demonstrate* the skill. You can adjust the assessment by recording any change in the space below the appropriate concept or skill. By using the a different or mark, a second, third, or further record can be put on the same page. You need record only adjustments on the student page.

Keeping assessments

The students' self-assessments should be placed in the their Science Record Books and passed on to the next-year teachers. In following years the students can look back on what they did in kindergarten.

Assessment as a report to parents

The students' assessments can be shared with parents at conference times. They can also be used as reports of progress to parents, with or without your adjustments.

STUDENT ROLE

Evaluator

MATERIALS

Suggested Script: *DASH* Kindergarten Concept and Skill Inventory

Teacher Assessment: *DASH* Kindergarten Concept and Skill Inventory

Student Page K.1.18 CONCEPT AND SKILL INVENTORY

PRODUCTS

Completed *DASH* Kindergarten Concept and Skill Inventory

PROCEDURES

1. **Help the students complete Student Page K.1.18 CONCEPT AND SKILL INVENTORY.**
2. **Check the students' self-assessments for any apparent discrepancies between the students' assessments and yours.**
3. **Check discrepancies between the students' assessments and yours by having them tell you about (teach) any questioned concept responses or show you (demonstrate) any questioned skill responses.**
4. **Have the students keep the completed inventory in their Science Record Books.**
5. **Share the inventories with the students' parents.**



**SUGGESTED SCRIPT
FOR ADMINISTRATION OF
KINDERGARTEN CONCEPT AND SKILL INVENTORY**

Page 1

CONCEPTS

Please circle *yes* or *no* to answer these questions.

1. Do you know what a **calendar** is?
2. Do you know what **yesterday** means?
3. Do you know what **different** means?
4. Do you know what a **family** is?
5. Do you know what a **friend** is?
6. Do you know what **cooperate** means?
7. Do you know what **safety** means?
8. Do you know what an **ending** is?
9. Do you know what a **week** is?
10. Do you know what a **month** is?
11. Do you know what a **season** is?
12. Do you know what **tomorrow** means?
13. Do you know what **weather** is?
14. Do you know what **temperature** means?
15. Do you know what a **crescent moon** is?
16. Do you know what an **animal** is?
17. Do you know what a **plant** is?
18. Do you know what **not-living** means?
19. Do you know what **decompose** means?
20. Do you know what **imaginary** means?



**SUGGESTED SCRIPT
FOR ADMINISTRATION OF
KINDERGARTEN CONCEPT AND SKILL INVENTORY**

Page 2

CONCEPTS

Please circle *yes* or *no* to answer these questions.

21. Do you know what **habits** are?
22. Do you know what a **mammal** is?
23. Do you know what some **animal needs** are?
24. Do you know what **defecate** means?
25. Do you know what **urinate** means?
26. Do you know what **grow** means?
27. Do you know what a **stem** is?
28. Do you know what a **seed** is?
29. Do you know what **plants** are used for?
30. Do you know what **environment** means?
31. Do you know what **food** is?
32. Do you know what **healthy** means?
33. Do you know what a **germ** is?
34. Do you know what **sanitation** or keeping things clean means?
35. Do you know what **conservation** or not wasting things means?
36. Do you know what a **thermometer** is?
37. Do you know what **protection** or guarding from injury means?
38. Do you know what a **shelter** is?
39. Do you know what **energy** is?



**SUGGESTED SCRIPT
FOR ADMINISTRATION OF
KINDERGARTEN CONCEPT AND SKILL INVENTORY**

Page 3

CONCEPTS

Please circle *yes* or *no* to answer these questions.

- 40.** Do you know what **technology** means?
- 41.** Do you know what a **map** is or is used for?
- 42.** Do you know what a **body compass** is or tells us?
- 43.** Do you know what **east** means?
- 44.** Do you know what **left** means?
- 45.** Do you know what **front** means?
- 46.** Do you know what **moonrise** is?
- 47.** Do you know what **sunset** is?
- 48.** Do you know what **rules** are used for?
- 49.** Do you know we mean when we say something takes up **space**?
- 50.** Do you know what **responsibility** means?
- 51.**
- 52.**
- 53.**
- 54.**
- 55.**
- 56.**



**SUGGESTED SCRIPT
FOR ADMINISTRATION OF
KINDERGARTEN CONCEPT AND SKILL INVENTORY**

Page 4

Please circle *yes* or *no* to answer these questions.

SKILLS

1. Do you know how to **observe** something?
2. Do you know how to **describe** or tell about something?
3. Do you know how to **cooperate** or work with others?
4. Do you know how to put something in **sequence** or in order?
5. Do you know how to **classify** or categorize things?
6. Do you know how to **count** things?
7. Do you know how to **compare** things?
8. Do you know how to make and read a **map**?
9. Do you know how to **use a ruler** to measure something?
10. Do you know how to **use a thermometer**?
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.
- 17.



KINDERGARTEN CONCEPT AND SKILL TEACHER ASSESSMENT

Page 1

[illegible]



KINDERGARTEN CONCEPT AND SKILL TEACHER ASSESSMENT

Page 2

[illegible]



KINDERGARTEN CONCEPT AND SKILL TEACHER ASSESSMENT

Page 3

CONCEPTS

KEY
N = No
Y = Yes

[illegible]



**KINDERGARTEN
CONCEPT AND SKILL
TEACHER ASSESSMENT**

Page 4

SKILLS KEY N = No Y = Yes																			
1. observe																			
2. describe																			
3. cooperate																			
4. sequence																			
5. classify																			
6. count																			
7. compare																			
8. map																			
9. use a ruler																			
10. use a thermometer																			
11.																			
12.																			
13.																			
14.																			
15.																			
16.																			



JOBS AT HOME

SP K.1.2

Name _____

Date _____

Sat								
Fri								
Thu								
Wed								
Tue								
Mon								
My Job								



CALENDAR REVIEW SP K.1.3

Name _____

Date _____

Color one square for each week.	How many weeks?	How many months?																																																
<table border="1"> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>																																																		
☐ How many full moons?	How many seasons?																																																	



HOME CALENDAR

SP K.1.4

Name _____

Date _____

SUN. /	
MON. /	
TUES. /	
WED. /	
THURS. /	
FRI. /	
SAT. /	



**WHAT I SAW ON THE
WAY TO SCHOOL
SP K.1.6**

Name _____

Date _____

Draw a picture of something you saw on the way to school.

①	②
③	④

Put an X on each of the senses you used.

	SIGHT	SMELL	HEARING	TASTE	TOUCH
1					
2					
3					
4					



**SAME AND
DIFFERENT
SP K.1.7**

Name _____

Date _____

Draw some shapes that are the same.

Draw some shapes that are different.



**CLASSIFICATION
TREE
SP K.1.8**

Name _____

Date _____

Show how you classified your collection.



**FUNCTIONS OF
THINGS
SP K.1.9**

Name _____

Date _____

Draw pictures of things you
can use to write with.

Draw pictures of things you
can use to measure other
things.

Draw pictures of things you
can use to hold things
together.

Draw pictures of things you
can use to write on.



**WORKING
DEFINITIONS
SP K.1.10**

Name _____

Date _____

Name _____

Date _____

This image shows a full page of handwriting practice paper. It features ten identical rows of horizontal guidelines. Each row is defined by three lines: a solid top line, a dashed middle line, and a solid bottom line. The rows are evenly spaced and cover the entire page area, providing a template for practicing letter formation and alignment.



**HOME
CONNECTIONS
SP K.1.12**

Name _____

Date _____

Draw some things that seem connected to things you have seen or done at school.



FAMILIES
SP K.1.13

Name _____

Date _____

Draw a picture of your family.

My Family

**WHO HELPS ME?**
SP K.1.14A

Name _____

Date _____

Who helps me?	How they help me



PEOPLE I HELP
SP K.1.14B

Name _____

Date _____

People I help	How I help them



**THINGS TO LEARN
TO DO
SP K.1.14C**

Name _____

Date _____

WHAT I WANT TO LEARN TO DO



FRIENDS
SP K.1.15

Name _____

Date _____

Autographs of Friends



MY MESSAGE LOG

SP K.1.17

Name _____

Date _____

Date	To Home	To School	Did it make it?		Did I report?	
			Yes	No	Yes	No

Name _____



**CONCEPT
AND
SKILL INVENTORY
SP K.1.18**

Name _____

Date _____

Page 1**CONCEPTS**

1.	calendar	no	yes
2.	yesterday	no	yes
3.	different	no	yes
4.	family	no	yes
5.	friend	no	yes
6.	cooperate	no	yes
7.	safety	no	yes
8.	ending	no	yes
9.	week	no	yes

Name _____

Page 2

CONCEPTS

10. month	no	yes
11. season	no	yes
12. tomorrow	no	yes
13. weather	no	yes
14. temperature	no	yes
15. crescent moon	no	yes
16. animal	no	yes
17. plant	no	yes
18. not-living	no	yes
19. decompose	no	yes
20. imaginary	no	yes

Name _____

Page 3

CONCEPTS

21.	habits	no	yes
22.	mammals	no	yes
23.	animal needs	no	yes
24.	defecate	no	yes
25.	urinate	no	yes
26.	grow	no	yes
27.	stem	no	yes
28.	seed	no	yes
29.	plant uses	no	yes
30.	environment	no	yes
31.	food	no	yes

Name _____

Page 4

CONCEPTS

32. healthy	no	yes
33. germ	no	yes
34. sanitation	no	yes
35. conservation	no	yes
36. thermometer	no	yes
37. protection	no	yes
38. shelter	no	yes
39. energy	no	yes
40. technology	no	yes
41. map	no	yes
42. body compass	no	yes

Name _____

Page 5**CONCEPTS**

43.	east	no	yes
44.	left	no	yes
45.	front	no	yes
46.	moonrise	no	yes
47.	sunset	no	yes
48.	rules	no	yes
49.	space	no	yes
50.	responsibility	no	yes
51.		no	yes
52.		no	yes
53.		no	yes

Name _____

Page 6

SKILLS

1.	observe	no	yes
2.	describe	no	yes
3.	cooperate	no	yes
4.	sequence	no	yes
5.	classify	no	yes
6.	count	no	yes
7.	compare	no	yes
8.	map	no	yes
9.	use a ruler	no	yes
10.	use a thermometer	no	yes
11.		no	yes
12.		no	yes
13.		no	yes
14.		no	yes



**KINDERGARTEN
CLUSTER 2**

Time, Weather, and Sky

- K.2.1 Weather Watch
- K.2.2 Beginnings
- K.2.3 Endings
- K.2.4 Day and Night
- K.2.5 Days, Weeks, and Months
- K.2.6 Moon Watch
- K.2.7 Moon Phases
- K.2.8 Seasons
- K.2.9 Clocks and Calendars



K.2.1 WEATHER WATCH

OBJECTIVES

The students

- make a concept map about weather
- observe and record weather conditions
- observe and record relative wind speeds
- observe and record outdoor temperatures
- relate temperature to seasons

BACKGROUND

WEATHER WATCH usually follows closely after Activities K.1.1 THE LEARNING CALENDAR and K.1.2 THE CLASS RESPONSIBILITY CHART and precedes K.1.3 CALENDAR REVIEW and K.2.8 SEASONS.

WEATHER WATCH begins a seven-year study of weather that continues for the entire year. The students should start to record weather data on the Learning Calendar as soon as possible. Periodically these data should be related to the seasons.

Concept map of weather

Begin by having students make a group concept map about weather. Kindergarten concept maps will mainly be pictorial. Have the students draw pictures of the things they know about weather on index cards, Post-it notes, or small pieces of paper. Label the pictures as needed. Pictures on cards, or pieces of papers can be glued to a large piece of chart paper around the word or phrase being explored. Lines can then be drawn from the pictures to the word and between pictures to show how ideas in the pictures are connected.

A concept map will give a good indication of what the students already know about weather. New pictures and connections can be added as the students learn more about weather.

Weather symbols

Weather symbols or logos should be invented by the students. They can invent logos for cloudy, rainy, snowy, partially clear, and other typical

kinds of weather. A class set of logos should be agreed upon and posted near the calendar on a class chart of weather logos.

Temperature

The students can begin to read the thermometer and record outdoor temperature from the very first days of *DASH*. This activity helps them develop number formation and recognition, use of thermometers, and the relationship between Celsius and Fahrenheit temperature scales.

Initially have the students copy the numbers across from the end of the liquid column. You can help them read the number of degrees at the time of the daily calendar review.

Group teaching of temperature

Use the technique of having students teach other students wherever possible to reinforce understanding. Once a small group of students can read and record the temperature, they can assist other students. If pairs of students are used to take readings, the first pair can teach the second pair, then the second pair can teach the third, and so forth.

Wind detector

A simple wind detector can be made by tying a narrow strip of fabric to a stick or dowel. The students can invent a wind detector as an art-science project or use a commercial windsock. The detector will give relative wind speed as determined by the angle the fabric makes with the supporting stick. To report speed, the angle the fabric makes with the support stick can be drawn on the calendar.

When the fabric is limp, there is no wind. When the fabric rises, there is wind, and the higher it rises, the greater the wind speed. Wind speed is usually quite variable. A good beginning discussion about constantly changing wind speed can develop out of this observation. Have the students decide whether they are going to record the highest the indicator blows or what they saw most of the time while they were measuring wind speed.

When to make observations

For comparative purposes it is best to make observations at about the same time each day. Many teachers find it convenient to have the students make weather observations the first thing in the morning before school begins or during their morning organization time.

Independence and responsibility

As soon as possible allow the students to collect weather data independently. They should form the habit of looking for their name on the Responsibility Chart and carrying out observations and recordings without further reminders.

STUDENT ROLES

Meteorologist
Inventor

MATERIALS

Learning Calendar
markers
thermometer, as large as possible with both °C and °F
wind detector (a strip of fabric on a stick or a windsock)
chart paper
3 x 5-in index cards, Post-it notes, or small pieces of paper
glue
Class Responsibility Chart
Student Page K.2.1 WEATHER LOGOS

PRODUCTS

Concept map about weather
Weather records
Class chart of weather logos
Class chart about wind
Completed Student Pages

PROCEDURES

1. **Help the students make a pictorial concept map about weather. Write the word *weather* boldly in the middle of a piece of chart paper.**

Have the students do the following:

- Draw what they think about when they hear the word *weather*.
✓ Have them draw on index cards, Post-its, or small pieces of paper.
- Glue the cards or paper pieces around the word *weather*.
- Tell what they know about their picture when they glue it to the map.
✓ Add a descriptive word to tell what the picture is about. This helps introduce the use of written language.

- Draw lines from *weather* to the pictures and between the pictures to show how the things they have drawn are connected.

2. Help the students invent logos to record general weather conditions.

Have them do the following:

- Suggest words to describe different kinds of weather.
✓ Help them include such conditions as cloudy, rainy, snowy, partially clear, sunny, and so forth. Others can be added later as needed.
- Draw symbols or logos to describe each different kind of weather on Student Page K.2.1 WEATHER LOGOS.
- Agree on a class logo or symbol for each kind of weather.
- Record the logos on a class chart of weather logos to be posted near the Learning Calendar.

3. Help the students draw an appropriate logo on the Learning Calendar each day to describe the weather that day.

4. Discuss temperature reading and temperature recording with the students.

Ask such questions as these:

- Does anyone know what this instrument is?
✓ If needed, supply the name *thermometer*.
- Does anyone know what we use a thermometer for?
✓ If needed supply the term *temperature*.
- This thermometer gives us two different ways to report temperature. Can someone show us two different columns of temperature numbers?
✓ If needed, show the columns.
✓ This question is appropriate only if a Celsius/Fahrenheit thermometer is used. A single-scale Celsius or Fahrenheit thermometer will be adequate for kindergarten.
- Does anyone know what the °C stands for?
✓ If needed, supply the term *Celsius*.
- Does anyone know what the °F stand for?
✓ If needed, supply the term *Fahrenheit*.

✓ Indicate that everyone will learn to read a thermometer and record the outdoor temperatures.

- 5. Work with the first group of students on reading temperatures. Demonstrate as needed. Have the students begin recording the temperatures on the Learning Calendar. Help them record the daily temperature in both Fahrenheit and Celsius scales.**

Help the students practice the following:

- Holding the thermometer by the edges or top without touching the bulb.
 - Looking straight at the thermometer to read it, rather than from above or below.
 - Making temperature readings.
 - Making temperature recordings.
 - Teaching each other how to record the temperature and read the thermometer.
 - ✓ After the first team can read and record temperature, they become *experts* and teach the next group how to read and record temperature.
 - ✓ Use this learn-teach technique wherever possible to reinforce each group's understanding and skills.
- 6. Help the students record the amount of wind as shown by the detector. Have them hold the detector stick straight up and draw a picture of where the fabric or windsock is. After a week have them interpret the meaning of the angles.**

Ask such questions as these:

- What does the wind do to our wind detector?
 - ✓ Get at the idea that when they hold the stick straight up in a wind, the wind blows the fabric out from the stick.
- Where is the fabric or windsock when there is no wind?
 - ✓ Note that it is against the support stick.
- Where is the detector when we have just a little wind?
 - ✓ Work for the idea that it is blown just a little away from the stick.

- Where is the detector when there is a lot of wind?
✓ Get at the idea that it is standing almost straight out from the stick.
 - Where is the detector when we have a mild wind?
✓ Work for the idea that it is between the little wind and the lot of wind position.
 - How is the wind detector like a flag?
 - What else acts like a wind detector?
✓ Help them include smoke, trees, flying paper, and so forth.
7. **Help the students record their descriptions and pictures of the wind detector on a class chart about wind. Have them draw pictures of three or four positions—no wind, a little wind, mild wind, and a lot of wind. Post the chart near the Learning Calendar.**
 8. **Periodically return to the concept map about weather and add new ideas and connections to it.**
 9. **Review weather data on the Learning Calendar whenever it is unrolled. Help the students relate their calendar data to the seasons.**

Ask such questions as these:

- What was the temperature like at the beginning of school?
- What was the weather like? What do our weather logos show?
- What was the wind like?
- What season were we in at the beginning of school?
✓ Work for late summer.
- What was the temperature like around Halloween?
- What was the weather like? What do our weather logos show around Halloween?
- What was the wind like around Halloween?
- What season were we in?
✓ Work for the idea of the fall season.
- ✓ Use questions like these each time the calendar is unrolled.

EXTENSIONS

- Have the students try to predict what the temperature will be before they measure it.
- Help the students predict what the Fahrenheit temperature will be when they take the Celsius temperature and what the Celsius temperature will be when they take the Fahrenheit temperature.



K.2.2 BEGINNINGS

OBJECTIVES

The students

- identify the beginnings of events
- associate beginnings with time

BACKGROUND

BEGINNINGS usually follows Activity K.1.1 THE LEARNING CALENDAR and precedes or is done concurrently with K.2.3 ENDINGS. Ideally, it will be followed by K.2.4 DAY AND NIGHT, K.2.5 DAYS, WEEKS, AND MONTHS, K.2.6 MOON WATCH, K.2.7 MOON PHASES, and K.2.9 CLOCKS AND CALENDARS.

Inquiry into when things begin can be incorporated into many *DASH* kindergarten activities. A simple statement that now we are beginning an activity will reinforce the idea of beginnings.

Beginnings and time

The beginning of an event is the starting point for measuring time. To understand the concept of time, students need practice in identifying when things start, especially in everyday experiences at school and home.

Learning Calendar and beginnings

When working with the Learning Calendar, emphasize beginnings by boxing them in green (the color for *go* in traffic lights) or otherwise highlighting them. Ending times can be boxed in red to help the students think about the relative time that various events take. (See Activity K.2.3 ENDINGS.)

Beginnings and endings chart

Create a class chart about beginnings and endings to encourage the students to relate times of beginnings and later the endings of events. The chart can be done with an *event* column in the middle and a *how do you know the beginning?* column on the left and a *how do you know the ending?* column on the right. The *how do you know?* columns can be filled with times, dates, special happenings, or other signals. Use picture illustrations when possible.

Clocks

Use a large digital clock in the classroom if possible so that times can be easily read. As with any experience, the use and meaning of time will develop with repeated exposure to clocks and references to time. With a digital clock many students will be able to tell when a specific time has arrived. But, like reading, functional capacity to use time is not anticipated to develop until grade 1 or later.

Routines chart

When the students become accustomed to the daily routines, a separate three-column beginning and ending chart can be developed to report them. This chart should have the times of beginnings and endings to reflect the daily schedule of the classroom.

To avoid getting locked into the iron grip of time, many teachers record routine times only for the beginning and ending of school, snack time, recess time, lunchtime, nap time, and so forth. This gives greater flexibility in class operations without the feeling of rush and guilt brought on by tightly written detailed schedules run by a galloping clock.

STUDENT ROLES

Chronologist
Timekeeper
Reporter
Record keeper

MATERIALS

Learning Calendar (See Activity K.1.1 THE LEARNING CALENDAR)
large digital clock
chart paper
markers

PRODUCTS

Class chart about beginnings and endings
Class chart of daily routines

PROCEDURES

1. **Go back and highlight the beginning of the school year on the Learning Calendar. Mark the month, day, and year of the first day of school. A green highlight reinforces the association with go or beginning.**

- Help the students invent an appropriate picture or logo to represent beginnings—a pointing finger, a bell, a light switch, and so forth.

2. **Record the beginnings of special events on the Learning Calendar and on a three-column class chart about beginning and endings. Throughout the school year add to the chart.**

Help the students do the following:

- Identify the beginnings of events.
 - ✓ Be sure to mark and record the beginning of each week, month, season, and school vacation.
- Keep track of birthdays as the beginning of a personal year, the first day of fishing season, the first in a series of special lessons, and so forth.
- Use an auditory or visual signal to mark the beginning of a class activity.
 - ✓ Clap your hands, ring a bell, raise your hand, and so forth.
 - ✓ Assign students the role of *starter* to signal the beginning of an event or activity.

3. **Develop a chart of daily routines with the students after they students have a well-developed chart of beginnings and endings. Identify and record the beginning time for routine activities. Keep a digital clock in front of the class.**

Ask such questions as these:

- When does school begin? How can we find out?
 - ✓ Get at the idea of observing for a day or so.
 - ✓ Though this is an opportunity to use clock time, other signals can be used such as a bell or your special signal.
- When does lunchtime begin?
 - ✓ Continue this kind of construction with the remainder of the major periods of the day.

4. Have the students check the correctness of the beginnings on their chart of routines and modify them if needed.

5. Discuss the beginnings of events.

Ask such questions as these:

- How did you feel about the beginning of the school year?
- How do you know when something begins? A book? A television program? A month? Playtime? Bedtime? Mealtime?

EXTENSIONS

- Help the students invent special signals to begin special events.
- Discuss Activity K.1.4 THE HOME LEARNING CALENDAR with the students and have them mark the beginnings of special events at home.



K.2.3 ENDINGS

OBJECTIVES

The students

- identify the endings of events
- compare the times between the beginnings and endings of events

BACKGROUND

ENDINGS usually follows Activity K.1.1 THE LEARNING CALENDAR and may follow or be done concurrently with K.2.2 BEGINNINGS. Ideally, it precedes K.2.4 DAY AND NIGHT, K.2.5 DAYS, WEEKS, AND MONTHS, K.2.6 MOON WATCH, K.2.7 MOON PHASES, and K.2.9 CLOCKS AND CALENDARS. As with beginnings, inquiry into when things end can be incorporated into many *DASH K* activities. A statement that now you are *ending* an activity will help reinforce the idea.

Use of Endings

In observing natural events and organizing our lives it is as important to know when an event ends as when it starts. Gaining a sense of endings and beginnings is essential to the later development of the concept of measured time.

Learning Calendar

In Activity K.2.2 BEGINNINGS the students mark the start of events on the Learning Calendar. They also use a class chart about beginnings and endings and a class chart of routines. Now they mark the endings. When working with the Learning Calendar, emphasize endings by boxing them in *red* (the color of *stop*) or otherwise highlighting them. The class will use these data to measure the relative time that various events take.

Logos

Help the students invent an appropriate picture or logo to represent an ending—a hand in a stop position, a finish tape, their beginning logo with a line through it, or other symbol.

STUDENT ROLES

Timekeeper
Reporter
Record keeper

MATERIALS

marking pens
class chart of beginnings and endings (See Activity K.2.2 BEGINNINGS.)
class chart of routines (See Activity K.2.2 BEGINNINGS.)
large digital clock

PRODUCTS

Learning Calendar showing beginnings and endings
Class chart about beginnings and endings
Class chart of routines

PROCEDURES

1. **Review with the students the beginnings of events on the Learning Calendar and the class chart about beginnings and endings. Discuss the endings of these events.**

Ask such questions as these:

- How do you know when something ends?
- How do you know when a book or story ends?
- How do you know when playtime or recess ends?
- How do you know when the school day ends?

2. **Help the students identify and mark the endings of special events on the Learning Calendar and the class the class chart of beginnings and endings. As new things emerge during the school year, be sure the beginnings and endings are identified.**

- Help the students invent an appropriate picture or logo to represent an ending.
✓ Be sure different logos are used for beginnings and endings.

3. Have the students describe how they identify the endings of class activities. Record endings on the class chart of routines.

- Use an auditory or visual signal to mark the ending of a class activity.
 - ✓ Clap your hands twice, sound a buzzer, start music to mark the ending of an activity.
 - ✓ Be sure a different signal is used for beginnings and endings.
- Assign students the role of *ender* to signal the ending of an event or activity.
- Have the students start to associate clock time with events by recording the digital clock times for endings as well as beginnings.

4. Have the students compare the relative length of times between beginnings and endings of different events.

Help the students do the following things:

- Determine which of two events such as the Thanksgiving holiday and the mid-winter holiday took longer.
 - ✓ Ask how they know.
 - ✓ Count the days on a calendar.
 - ✓ Arrange other events from longest to shortest.
- Develop their own comparative language for relative length of time, for example, about as long as a *morning recess*, a *lunch recess*, a *school day*.

5. Summarize the discussion of endings and beginnings.

Ask such questions as these:

- What kinds of things are easy to tell when they start and end?
- Do you always know when things start and end?

EXTENSIONS

- Have the students count the days until the weekend, a holiday, special event, or the end of school. Then introduce the idea of a countdown to that event. Record the countdown on the Learning Calendar.
- Tell or read stories about beginnings and endings.



K.2.4 DAY AND NIGHT

OBJECTIVES

The students

- recognize that daytime and nighttime follow each other
- identify the kinds of events that typify different periods of daytime and nighttime
- develop working definitions of daytime and nighttime
- make a Day-and-Night Clock

BACKGROUND

DAY AND NIGHT usually follows Activities K.1.1 THE LEARNING CALENDAR, K.2.2 BEGINNINGS, and K.2.3 ENDINGS and precedes K.2.5 DAYS, WEEKS, AND MONTHS, K.2.6 MOON WATCH, K.2.7 MOON PHASES, and K.2.9 CLOCKS AND CALENDARS.

Building on work done with beginnings and endings, the students now investigate how daytime and nighttime are different and how each is divided into periods. The activity concludes with the making of a Day-and-Night Clock.

Concept maps

Start with concept maps about daytime and nighttime to get a sense of what the students know. Some students may associate the moon only with nighttime. Don't rush to correct this misconception. It will be dealt with in Activities K.2.6 MOON WATCH and K.2.7 MOON PHASES.

Periods within daytime and nighttime

Dividing daytime and nighttime into periods gives students an opportunity to be creative. Longer periods might be morning, afternoon, evening, and late night. Shorter time periods might be wake-up time, dressing time, breakfast time, going-to-school time, and so forth.

Making clocks

The students make clocks to show the recurrence of sunlight and darkness in the day-and-night cycle. On the clock face they divide nighttime and daytime into the shorter periods they have identified and

illustrate their clock faces with pictures that are associated with them. Be sure to keep several clocks for Activity K.2.9 CLOCKS AND CALENDARS.

Working definitions of daytime and nighttime

The students produce working definitions of daytime and nighttime. Usually these definitions capture the idea of *daytime* as the period of sunlight and *nighttime* as the period of darkness when the sun is not in the sky.

The word *day* can be surrounded by confusion since a day in the context of a calendar is a 24-hour period, but it is also the part of that 24-hour period in which the sun is up. One solution, the one used here, is to refer to the daylight period as *daytime* and the non-daylight period as *nighttime*. Over time, the multiple meanings of day will be resolved.

STUDENT ROLES

Timekeeper
Reporter
Record keeper
Clockmaker

MATERIALS

Learning Calendar (See Activity K.1.1 THE LEARNING CALENDAR.)
markers
chart paper
Post-it glue (optional)
white glue
large analog clock or model clock with hands
paper plates
brass fasteners
index cards
hole punch
large nail or paper punch
class chart of beginnings and endings (See Activity K.2.3 ENDINGS.)
Student Pages K.2.4A THROUGH THE DAY AND NIGHT
K.2.4B DAY AND NIGHT

PRODUCTS

Concept map about daytime
Concept map about nighttime
Day-and-Night Clocks

Working definition of daytime
 Working definition of nighttime
 Completed Student Pages

PROCEDURES

1. **Have the students make a pictorial concept map about daytime.**

Help them include such things as these:

- What is in the sky in the daytime.
- What they do during the daytime.
- What other people do during the daytime.

2. **Have the students make a second concept map about nighttime. Help them include ideas about what is seen in the sky and what people do. See comments about the moon in the Background section.**

3. **Help the students put the two concept maps together and compare them to show relationships between daytime and nighttime.**

Ask such questions as these:

- How are the daytime and nighttime skies different? How are they alike?
- How are the things you do during the day different from the things that you do during the night?
- How are the things other people do during the day different from the things that they do during the night?

4. **Help the students identify different time periods within the daytime and nighttime. List these time periods.**

Ask such questions as these:

- Do you ever talk about times of day such as breakfast time or school time? What other times of day are there?
- When we talk about daytime how do we divide it up?
 ✓ Work for such ideas as morning, afternoon, and so forth.

- When we talk about nighttime, how do we divide it up?
 - ✓ Work for such things as evening, late night, and so forth.
 - Are there other ways of dividing daytime and nighttime?
 - ✓ Get at clock time.
- 5. Help the students draw or cut out small pictures of things they see at different times of day and night. The pictures can be glued in order on Student Page K.2.4A THROUGH THE DAY AND NIGHT. Have the students begin with early morning and evening at the top of the page.**
- Help the students do the following:
- Draw or find small pictures showing different times periods of day and night.
 - ✓ Work for the events of breakfast time, school time, dinner time and so forth.
 - ✓ Student Page K.2.4B DAY AND NIGHT can be used here as well as in Procedure 7 below.
 - Include things that are common to these time periods.
 - Cut out the pictures and put them in order and glue them on Student Page K.2.4B DAY AND NIGHT.
 - ✓ Help the students check each other's order.
- 6. Have the students observe how the hands of an analog clock move.**
- Ask them how the hands of a clock move.
 - Have the students observe the movement of a clock's hands.
 - ✓ Point out the *clockwise* movement.
- 7. Help the students make a Day-and-Night Clock. Help them divide a paper plate into daytime and nighttime periods and paste on corresponding pictures.**
- Discuss with the students how they might show both daytime and nighttime on the same clock.
 - ✓ Work for coloring each half of the paper plate a different color.
 - ✓ It will help to standardize the night and day sides of the clock for the work that follows.

- Help the students draw and color their own pictures or color and cut out the pictures from Student Page K.2.4B DAY AND NIGHT.
- Discuss with the students how to use their pictures to show different periods on the clock.
- Have the students paste the pictures on the clock face in the order the clock's hands move (clockwise).
 - ✓ Post-it glue can be used to hold the pictures until they have been tested in Procedure 9.
 - ✓ Once tested, they can be securely glued down.

8. Help the students make and attach a single hand to their Day-and-Night Clocks.

Help them do the following:

- Cut index cards into strips to make pointers for their clocks.
- Cut a point at one end of a strip and punch a hole in the opposite end with a punch or nail.
- Mark the centers of their paper plates and make holes through the center of the plate.
- Attach the pointer to the clock face with a brass fastener.

9. Have the students test their Day-and-Night Clock to see whether it is accurate as the hand moves clockwise.

Have them do the following:

- Direct the pointer at the picture that shows the present time period.
- Look to see whether the things shown are the ones people usually see or do at this time of day.
- Move the pointer clockwise to the next time period and check to see whether this shows the things people usually do at this time of day.
- Continue until all time periods on the clocks are investigated.
 - ✓ If the order is wrong, have the students remove the pictures and reorganize or just paste over them.

- 10. Help the students review and add to their concept maps. Have them create working definitions for daytime and nighttime by describing how they know when each begins and ends.**

Below are some examples of possible working definitions:

- *Daytime* is the time beginning when sunlight appears and ending when darkness appears.
- *Nighttime* is the time beginning when darkness appears and ending when sunlight appears.
- *Daytime* is the time beginning when we get up and ending when we go to bed.
- *Nighttime* is the time beginning when we go to bed and ending when we get up.

- 11. Have the students discuss their observations and feelings about daytime and nighttime.**

Ask such questions as these:

- Does the night sky make you wonder? If so, what are some things you wonder about?
- Are mornings exciting for you? Why? Why not?
- What is your favorite—daytime or nighttime? Why?

EXTENSIONS

- Have the students make a clock of the daily class schedule for the classroom.
- Have the students make a large class Day-and-Night Clock.
- Read stories about day and night. See the *DASH Book List* for suggestions.



K.2.5 DAYS, WEEKS, AND MONTHS

OBJECTIVES

The students

- distinguish between a school day and a calendar day
- distinguish between a school week and a calendar week
- count and graph the days in a school week, a calendar week, and the calendar months

BACKGROUND

DAYS, WEEKS, AND MONTHS usually follows Activities K.1.1 THE LEARNING CALENDAR, K.2.2 BEGINNINGS, K.2.3 ENDINGS, K.2.4 DAY AND NIGHT, and precedes K.2.6 MOON WATCH, K.2.7 MOON PHASES, and K.2.9 CLOCKS AND CALENDAR. In DAYS, WEEKS, AND MONTHS the students compare school and calendar days and compare and graph the number of days in a school week, a calendar week, and a calendar month.

Some history

From ancient times the units of the calendar—days, weeks, months, and years—have been used to organize the happenings in society. These units often had their origin in astronomical events. The beginning of a day was originally marked by the rising of the sun. A month was the period of a moon phase. The Greeks had a 10-day week; the Romans had a 9-day week. Ancient Babylonians noticed that a quarter of a moon cycle took about 7 days and used this number. The year was the period from one winter solstice (the longest night of the year) to the next or the period from one seasonal event such as the flooding of the Nile to the next time it occurred.

Multiple meanings

Differences in the length of a school and a calendar week; a school and a calendar year; and a school day, a daytime day, and a 24-hour day are confusing. This activity gives the student a chance to begin distinguishing between these different events.

When to use

An opportune time to start this activity is at the midyear Learning Calendar unrolling. By that time there will be sufficient data on the calendar to allow the students to make day, week, and month counts. Verification can come with the next unrolling.

Mathematics and graphing

Most students will have mastered counting and number recording or will at least be able to follow the process by midyear. This, however, may be a first opportunity for the students to graph. Make the activity as concrete as possible by using graph squares that look like the spaces on a calendar to represent each day.

STUDENT ROLES

Lexicographer
Reporter
Chronologist

MATERIALS

Learning Calendar
assorted calendars
chart paper
glue
concept maps about daytime and nighttime from Activity K.2.4 NIGHT
AND DAY
Student Pages K.2.5A DAYS AND WEEKS
K.2.5B DAYS AND MONTHS

PRODUCTS

Expanded concept maps about daytime and nighttime
Class bar graph of days, weeks, and months
Completed Student Pages

PROCEDURES

1. Review the students' working definitions of daytime and nighttime from Activity K.2.4 DAY AND NIGHT and talk about the idea of school day.

Ask such questions as these:

- What were our working definitions of daytime and nighttime?
- Now think about our school day. What do we mean by school day?
 - ✓ Get at the idea that it is the time we are in school.
- Which is longer, our daytime or a school day?
 - ✓ In all but Alaskan and other high-latitude schools, daytime will be longer than the school day. The important thing is to help the students see that they are not the same length.

2. Help the students make a working definition of a school day in terms of when it begins and ends.

Below are some examples:

- A *school day* is the time at school and begins when the flag is raised in the morning and ends when it is lowered in the afternoon.
- A *school day* is the time at school and begins when the students get off the bus at school and ends when they get on the bus to go home.
- A *school day* is the time at school and begins at 8:00 A.M. and ends at 2:00 P.M. Mondays through Fridays.

3. Show and discuss different kinds of calendars. Include calendars with one day per page, one week on a single page, one month on a page, and one year on a page. If possible include a continuous one-year calendar with no blocking off of months.

Ask such questions as these:

- How long a time does a calendar day seem to cover?
 - ✓ Use a day or other calendar that has entry lines for 24 hours.
 - ✓ Help the students notice that the calendar day includes the night.
- What might a working definition of a calendar day be?
 - ✓ One example might be a *calendar day* is the time that begins at sunrise and ends at the next sunrise.

✓ Another example might be a *calendar day* is the time that begins right after midnight and ends right after the next midnight.

✓ If the students are not sure of the definition, put a question in the Wonder and Discover Book and come back to it later.

- Which is the longest, daytime, a school day, or a calendar day? Which is the shortest?
- How much time does one page of each of these different calendars cover?
 - ✓ Try to include calendars that have a single day, a week, a month, and a year on a single page.
- Why might people want to have different kinds of calendars covering different time periods?
 - ✓ Get at the need to sometimes think about only a day, sometimes a week or a month, and sometimes a full year.

4. Help the students mark the beginning and ending of a school week on the Learning Calendar and count the days.

Help them to the following:

- Record the number of days in a school week on Student Page K.2.5A DAYS AND WEEKS.
- Make a working definition for a school week.
 - ✓ Get at the idea that this is the time when they are in school and there are usually 5 days in a school week.

5. Help the students mark the beginning and ending of a calendar week on the Learning Calendar and other calendars and count the days in the calendar week.

Help them do these things:

- Record the number of days in a calendar week on their Student Page K.2.5A DAYS AND WEEKS.
- Make a working definition for a calendar week.
 - ✓ Get at the idea this is the time that goes from Sunday to Sunday and that there are 7 days in a calendar week.
- Repeat this counting going back for at least a month so the students can validate their definition.
 - ✓ Note that the count remains the same for each week.

- 6. Review Student Page K.2.5A DAYS AND WEEKS and ask the students to compare a school week with a calendar week.**

Ask such questions as these:

- Which has more days, a school week or a calendar week?
- What makes a calendar week longer?
- Are all calendar weeks the same?
✓ There may be some confusion about weeks that occur at the beginning or end of months. This is the reason for including a *continuous* calendar that shows all weeks as 7 days in length.
- Are all school weeks the same? Why are some school weeks different?
✓ Get at such things as the shortening because of holidays, even the lengthening for make-up days.

- 7. Have the students mark the beginning and ending of a month on the Learning Calendar and wall calendars. Have the students work in small groups each with a different month.**

- Help them count the days in their months and record their counts on Student Page K.2.5B DAYS AND MONTHS.

- 8. Help the students make a class bar graph using work from Procedure 7 comparing the days in a school week, a calendar week, and the different months of the year.**

Have them do the following:

- Cut out the squares in strips and glue them to chart paper to make the graph.
✓ One-inch grid paper can also be used.
- Label the graph with the name and possibly a picture symbol or logo for a calendar day, a school week, a calendar week, and each of the twelve months of the year.

- 9. Summarize the study of calendars.**

Ask such questions as these:

- Which is longer, the school day or the calendar day? Why?
- Do all school weeks have the same number of days?
- Do all calendar weeks have the same number of days?

- Do all months have the same number of days?
 - Which months have the same number of days?
 - Which month is the shortest? Longest?
 - How could we find out how many weeks are in a month? How many are there?
 - What is a working definition of a month?
 - ✓ Something like a month is a period of time between 28 and 31 days and has about four weeks.
-

EXTENSION

- Have the students make a graph showing the number of days in a year, the number of days in a school year, and the number of vacation days in a school year.



K.2.6 MOON WATCH

OBJECTIVES

The students

- record and report their observations of the moon's cycle
- count the days from one full moon to the next

BACKGROUND

MOON WATCH usually follows Activities K.1.1 THE LEARNING CALENDAR, K.2.2 BEGINNINGS, K.2.3 ENDINGS, K.2.4 DAY AND NIGHT, K.2.5 DAYS, WEEKS, AND MONTHS and precedes K.2.7 MOON PHASES and K.2.9 CLOCKS AND CALENDAR. In MOON WATCH the students observe and count the number of days between full moons.

Astronomical cycles

The students used the earth's sunlight cycle in Activity K.2.4 DAY AND NIGHT to develop a working definition of daytime and nighttime and to build a clock. In MOON WATCH, they watch the sky during the day and night to see whether the moon has a natural cycle. They observe and record the shape of the moon and count the days between two full moons, a period called a *moon cycle*. A moon cycle is between 29 and 30 days.

Weather and observation.

Although it would be ideal to be able to see the moon each day during the Moon Watch, it is not necessary provided the students leave blank spaces on their record sheets when they cannot make observations. In fact, this leads to the very important question, Is the moon there even when we can't see it? By finding the regularity in their observation the students will begin to hypothesize that astronomical events occur even when they cannot see them.

Season for the activity

This activity is a good activity to do in the spring when families can join in the nightly search for the moon. Part of the time the moon will be up during the daytime and can be viewed during school hours. When possible, use school observations to fill in blanks left in home observations.

When to start

Start at a full moon, which is usually easy to find in the night sky. This is a flexible time since there are about three days when the moon appears to be full.

Alerting parents

Before starting the Moon Watch, send word home to parents that a Moon Watch is about to begin and that their help will be needed. Be sure to explain what to do if the sky is too cloudy to see the moon and how to handle those nights when it is not convenient to make observations. It is exciting for many families to discover for themselves that much of the time the moon is up during the daytime, so don't mention this in your communications. See Fig. K.2.6 for a sample letter.

Continuing count

It is suggested that the students continue to record moon information in the next cycle. This need not be at home. MOON WATCH will be reinforced in Activity K.2.7 MOON PHASE where the students will look particularly for the sequence of the phases and compare the day counts between two new moons and two full moons.

STUDENT ROLES

Astronomer
Record keeper
Chronologist

MATERIALS

Learning Calendar
markers
crayons
note to parents
Student Page K.2.6 MOON WATCH

PRODUCTS

Completed Student Pages

PROCEDURES

1. Find out what the students already know about the moon.

Ask such questions as these:

- When did you last look at the moon?
- What did it look like?
- Does the moon always look the same?
- Where did you see the moon?
- What do you think a full moon looks like?

2. Introduce the idea to the students of counting the days from one full moon to the next.

Help them do the following:

- Make predictions about the number of days between full moons.
- Record their individual predictions on Student Page K.2.6 MOON WATCH.

3. Ask the families to help their children observe the moon each evening. Send a note explaining the assignment. See Fig. K.2.6.

- Beginning with a full moon, have the students color a moon on the student page each day they observe one until the next full moon.

4. If the moon is visible during the day, take the class outdoors to observe it.

5. Help the students record their moon data on the Learning Calendar.

Help them do the following:

- Draw a full moon to indicate they saw a full moon at the beginning of the Moon Watch.
- Put a one (1) under the picture to show the *beginning* of the Moon Watch.
- ✓ See Activity K.2.2 BEGINNINGS.

- Draw the moon as it appears each day or night and count each day until they see the next full moon.
- Make a special mark to indicate the *ending* of the Moon Watch.
✓ See Activity K.2.3 ENDINGS.

6. Discuss and summarize the results of the Moon Watch with the class.

Ask such questions as these:

- How many days are there from full moon to full moon?
- Was the moon always full? If not, what did the moon look like?
- When it is cloudy or rainy, what do you think happens to the moon? Do you think the moon is still in the sky?
- Have you ever seen the clouds cover and then uncover the moon? Is the moon still in the sky?
- Have you ever seen the light of the moon behind the clouds? Is the moon still in the sky?
- Did you ever see the moon during the day?
- Have you ever seen the sun at night?
- Do you think the number of days from full moon to full moon is always the same? How could we find out?
✓ Get at the idea that they can count again to the next full moon.

7. Help the students reach the idea that we can repeat the Moon Watch to check their results. Encourage curiosity and record their questions in the Wonder and Discover Book.

EXTENSION

- After several moon cycles, review the Learning Calendar and have the students count the days between full moons. Have them compare the number of days in these cycles. Expect answers between 27-32 days. Astronomically, it is about 29-1/2 days.

Dear Family:

Our kindergarten class is about to start a Moon Watch and we need your help. Over the next thirty days we will be observing the moon as it appears in the sky. So that the observations are comparable, we will start at the time of the next full moon, which will appear about _____.

I have enclosed a copy of a sheet to keep track of the moon. Please help your child color a drawing each time the moon is observed.

There may be times when cloud cover will make observation impossible. Have your child invent a way to show times when no observation was made. Do not become concerned since the way we deal with missing data is one of the lessons of this Moon Watch. The moon will usually be visible in either the early evening or early morning.

We may need your help later if more moon observations are needed.

Please send the observation sheet back to school after the Moon Watch is completed. Enjoy this time of learning with your child.

Thank you,

Fig. K.2.6 Sample initial Moon Watch note



K.2.7 MOON PHASES

OBJECTIVES

The students

- compare the time between two full moons with the time between two new moons
- observe, report, and record phases of the moon from new moon to new moon
- sequence moon phases
- identify the moon cycle as one of nature's clocks.
- make a Moon Clock

BACKGROUND

MOON PHASES usually follows Activities K.1.1 THE LEARNING CALENDAR, K.2.2 BEGINNINGS, K.2.3 ENDINGS, K.2.4 DAY AND NIGHT, K.2.5 DAYS, WEEKS, AND MONTHS, K.2.6 MOON WATCH and precedes K.2.9 CLOCKS AND CALENDAR. In MOON PHASES the students again observe the phases of the moon starting with the new moon and then construct a Moon Clock. Families are once more asked to participate.

Connections with MOON WATCH

In the previous activity K.2.6 MOON WATCH, the students count the days between two full moons. In MOON PHASES they count the days and watch the phases between two new moons. The students find that the period of time between the new moons is about the same as the period between full moons. Special focus here is on the phases of the moon and their order. The students use their observations to help make a Moon Clock.

Moon phases

Starting with the new moon, the phases follow in an ordered sequence. There are eight phases—the new moon phase, the waxing or growing crescent phase, the waxing quarter phase, the waxing gibbous phase, the full moon phase, the waning or shrinking gibbous phase, the waning quarter phase, and the waning crescent phase.

When to use the activity

MOON PHASES can be used anytime after Activity K.2.6 MOON WATCH; however, to get maximum reinforcement of ideas, it is best done in the next moon cycle. Emphasize that this activity has different objectives from MOON WATCH. In MOON PHASES the students are getting a count of the number of days between *new moons*. They are also comparing this count with the count made in MOON WATCH. Further, they are focusing on the phases in the moon cycle.

STUDENT ROLES

Astronomer
Record keeper
Chronologist
Clock maker

MATERIALS

Learning Calendar
markers
crayons
glue
paper plates
brass fasteners
index cards
hole punch
chart paper
letter to families

Student Pages K.2.7A NEW MOON
K.2.7B SEQUENCE CARDS, pages 1 and 2
K.2.7C MOON CLOCK
K.2.7D MOON PHASES

PRODUCTS

Class chart of moon phases
Moon Clocks (Several will be needed in Activity K.2.9.)
Completed Student Pages

PROCEDURES

1. Review Activity K.2.6 MOON WATCH with the students.

Ask such questions as these:

- How many days did we find between two full moons?
✓ Introduce the idea that this period is a *moon cycle*.
- What did the moon look like during the moon cycle?
- When is the best time to watch the moon?
- Did you ever see the moon during the day?
- What does a *new moon* look like?
- Was there a time when the moon was very small? What did it look like?
✓ Identify this as the time of the new moon.

2. Discuss the students' predictions of the number of days from one new moon to the next new moon.

Help the students do the following:

- Predict the number of days from one new moon to the next.
Record their predictions on Student Page K.2.7A NEW MOON.
- Describe and discuss the various shapes (phases) of the moon they observed in Activity K.2.6 MOON WATCH.
- Tell what they think the moon phases will look like when they observe them again.

3. Again ask the parents to help their children observe the moon whenever possible.

- Send a note to the families explaining the continuing assignment. Include Student Pages K.2.7A NEW MOON and K.2.7D MOON PHASES. See Fig. K.2.7 for a sample note.
- Begin with a new moon and have the students identify the moon phases and count the days until the next new moon.
✓ Have them use Student Page K.2.7A NEW MOON to record the phases in pictures.

4. Each day have the students report and record their data on the Learning Calendar.

Help them do the following:

- Draw the moon phases on the Learning Calendar.
✓ Ask, what the shape of the moon was.

- Name the phases as specific shapes are identified by the students.
 - ✓ See Student Page K.2.7D MOON PHASES for names of the phases.
 - ✓ The concepts of waxing and waning will be introduced in DASH 1.
- Mark the *new moon* as the *beginning* of this cycle.
- Draw the moon phase for each day they see the moon.
- Mark the next *new moon* or the *ending* of this cycle.
- Count the days between new moons.
- Record the count on their calendar.
- Have the students bring back completed Student Page K.2.7A NEW MOON.

5. Discuss the results of the Moon Watch with the class.

Ask such questions as these:

- How many days are in a moon cycle starting with the new moon?
- How many days are there from the new moon to the full moon?
 - ✓ There will be about 14.
- How many days are there from the full moon to the new moon?
 - ✓ There will be about 14.
- What are the moon phases in the order you saw them?
- How are the moon phases alike? How are they different?
- How many days were there in the cycle we observed from full moon to full moon?
 - ✓ There were between 28 and 31 days depending on the interpretation of new moon. the atime is about 29-1/2 days.
- How are the full-moon-to-full-moon and the new-moon-to-new-moon cycles alike?
 - ✓ The counts should be about the same.

- How are they different?
✓ Get at the idea that they have different starting points in the cycle.
- 6. Have the students work in groups to cut out the set of large moon-phase pictures in Student Page K.2.7B SEQUENCE CARDS and put them in order.**
- Some students may arrange the cards in a linear sequence while others may form a circular sequence.
 - Have them share and explain their sequences.
✓ Encourage the students to make any modifications they wish.
- 7. Help the students organize to make a Moon Clock. Have them cut out the set of small moon-phase pictures from Student Page K.2.7C MOON CLOCK.**
- Ask the students where they would place or draw the new and full moon cut-outs on their paper plate.
✓ Note that the period between a new moon and a full moon is half a cycle, so they would place the new moon across from the full moon on the plate.
 - Help the students lay the rest of the moon phase cut-outs in order on the clock face.
✓ Ask them where the quarter moons go, where the crescent moons go, and finally where the gibbous moons go.
✓ Use the sequence cards for reference.
- 8. Help the students make the clock.**
- Help the students do the following:
- Make a clock by drawing or gluing their set of cut-outs onto the plate.
 - Cut index cards into strips to make pointers.
 - Cut a point at one end of a strip and punch a hole in the opposite end with a punch or nail.
 - Mark the centers of their paper plates and make holes through the center of the plate.
✓ You may want to punch the hole in the plate.
 - Attach the pointer to the clock face with a brass fastener.

- 9. Have the students test to see whether their clocks are accurate. Save several Moon Clocks for Activity K.2.9 CLOCKS AND CALENDARS.**

Help them do the following:

- Direct the pointer to the current moon phase.
 - Move the pointer to show the next phase. If their clocks are accurate, the pointer will move in the same order as the moon phases appear.
 - Redo the clock to correspond with their observations if necessary.
 - Look at subsequent moon cycles as a way of validating their data.
-

EXTENSIONS

- Celebrate the moon's birthday. Point out that the new moon is the beginning of another cycle and another birthday. Have the students join in the planning.
- Have the students make a large class Moon Clock.

Dear Family:

Our kindergarten class is again observing the moon. This time we will start with the new moon, which will appear in the sky about_____.

Enclosed is another moon observation sheet. In addition to investigating the length of the moon cycle starting from different phase, this time we will be paying closer attention to the shape and sequence of the phases. Please help your child draw the shape of the moon in the circles. We will also be giving names to the different phases. An information sheet is attached for your reference.

Again there may be times when cloud cover will make observation impossible. Have your child invent a way to show times when no observation was made. The moon will usually be visible in either the early evening or early morning.

Thanks for your help. Please send the observation sheet back to school after the Moon Watch is completed. Have fun observing with your child.

Thank you for your help.

Fig. K.2.7 Sample Moon Watch follow-up letter



K.2.8 SEASONS

OBJECTIVES

The students

- identify the characteristics of seasons—the signs of the seasons
- identify the beginnings and endings of seasons
- recognize the change of seasons as one of nature's clocks

BACKGROUND

SEASONS usually follows Activities K.1.1 THE LEARNING CALENDAR, and precedes K.2.9 CLOCKS AND CALENDAR. In SEASONS the students observe and characterize the seasons. During the year they chart the events of each season and summarize their work by making a Seasons Clock.

Seasons

Seasons are periods marked by certain natural events and human activities—the signs of the seasons. We recognize them by changes in plant growth, animal behavior, weather, and the amount of sunlight. In SEASONS the students watch for signs in nature to identify the seasons. They also note seasonal holidays and other special events. In the late winter they make Seasons Clocks to show the order of seasons and test them by watching seasonal events the rest of the school year.

Building the activity

SEASONS is a long-term activity usually begun shortly after the introduction of the Learning Calendar. See Activity K.1.1 LEARNING CALENDAR. The students make class charts summarizing the signs of the seasons using a collection of pictures.

Seasons Clock

Finally, the students make Seasons Clocks to show the sequence and characteristic signs of the seasons. These clocks have the same design as the Day-and-Night and Moon-Phase Clocks. Be sure to keep several clocks for Activity K.2.9 CLOCKS AND CALENDARS.

STUDENT ROLES

Naturalist
Timekeeper
Reporter
Chronologist
Clockmaker

MATERIALS

Learning Calendar
chart paper
markers
glue
paper plates
brass fasteners
index cards
hole punch or large nails
Student Pages K.2.8A SEASONS: SUMMER SIGNS
K.2.8B SEASONS: FALL SIGNS
K.2.8C SEASONS: WINTER SIGNS
K.2.8D SEASONS: SPRING SIGNS
K.2.8E SEASONS

PRODUCTS

Class chart about signs of summer
Class chart about signs of fall
Class chart about signs of winter
Class chart about signs of spring
Seasons Clocks
Completed Student Pages

PROCEDURES

1. In late September or early October, review the Learning Calendar and have the students look for the signs of summer and think about other signs. Help them record the signs in pictures on Student Page K.2.8A SEASONS: SUMMER SIGNS. Make a class chart about signs of summer.

Help them recall such things as these:

- Weather information including temperature, rain, and wind.

- Characteristics of plant life and the special fruits, vegetables, and flowers of summer.
 - Behavior of animals including insects.
 - Holidays.
 - Sports and other seasonal activities.
 - Seasonal clothing.
2. **In November, review the Learning Calendar and have the students look for the signs of fall and think about other signs. Have them use Student Page K.2.8B SEASONS: FALL SIGNS to record the signs they have seen. Make a class chart about the signs of fall.**

Help them include the following:

- Weather information, including temperature, rain, snow, and wind.
 - Sun observations comparing the amount of sunlight and darkness now with the amount last summer.
 - Characteristics of plant life such as changing leaf colors and falling leaves.
 - Behavior of animals including insects.
 - Holidays.
 - Sports and other seasonal activities.
 - Seasonal clothing.
3. **In late January or early February look for winter signs on the Learning Calendar and think about other signs. Have the students use Student Page K.2.8C SEASONS: WINTER SIGNS to record their observations. Make a class chart about signs of winter.**

Help them include these things:

- Weather information, including temperature, rain, snow, and wind.
- Sun observations comparing the amount of sunlight and darkness now and last summer.

- Characteristics of plant life such as dead plants, bare trees, and evergreens.
 - Behavior of animals including insects.
 - Holidays.
 - Sports and other seasonal activities.
 - Seasonal clothing.
4. **In late March or early April, have the students look for signs of spring on the Learning Calendar and think about spring signs. Have them use Student Page K.2.8D SEASONS: SPRING SIGNS to record observations. Make a class chart about signs of spring.**

Help them consider the following:

- Weather information, including temperature, rain, snow, and wind.
 - Observations on the amount of sunlight.
 - Characteristics of plant life such as budding trees and spring flowers.
 - Behavior of animals including insects.
 - Holidays.
 - Sports and other seasonal activities.
 - Seasonal clothing.
5. **Review and discuss the class charts. Help the students summarize the signs of each season.**

Ask such questions as these:

- What are some of the signs of summer? Fall? Winter? Spring?
- How many months are there in each season? Weeks? Days?
- How are the seasons similar? How are they different?
- How are the weather conditions for seasons alike? How are they different?

- Are the same plants growing outdoors during different seasons?
- Do you find animals in the same places during different seasons?
- What kind of clothes do you wear during each season?
- What are some holidays and special days for each season?
- What are some things that you can do in some seasons but not in others?
- Which is your favorite season? Why?

6. Help the students make a Seasons Clock.

Have them do the following:

- Divide the plate into quarters.
- Color and cut out Student Page K.2.8E SEASONS or draw their own small pictures to be cut out.
✓ Magazine cutouts can also be used.
- Recall the way the hands of a clock turn.
✓ Review the clockwise turning of the analog clock.
- Place the label cutouts of the seasons (student, magazine, or Student Page pictures) on their plate in sequence.
- Check each other's sequencing of the labels. Make adjustments.
- Glue the season labels to the plate.

7. Help the students complete the clock by adding a pointer.

Help the students do these things:

- Cut index cards into strips to make pointers.
- Cut a point at one end of a strip and punch a hole in the opposite end with a punch or nail.
- Mark the center of their paper plate and make a hole through the center.
- Attach the pointer to the clock face with a brass fastener.

8. Help the students test their Seasons Clocks.

Have them do the following:

- Direct the pointer to the current season.
- Check to see that the pointer moves in the same order that the seasons occur.
 - ✓ Reinforce the idea of clockwise motion.

EXTENSIONS

- Read stories about seasons. See the *DASH Book List* for suggestions.
- Help the students make a class book about seasons.
- Make a large class Seasons Clock.
- Help the students make a chart of illnesses and injuries that are common during each season. Some of these data can come from the Learning Calendar.



K.2.9 CLOCKS AND CALENDARS

OBJECTIVES

The students

- review and compare nature clocks
- identify and compare periods that clocks and calendars measure

BACKGROUND

CLOCKS AND CALENDAR summarizes Activities K.1.1 THE LEARNING CALENDAR, K.2.2 BEGINNINGS, K.2.3 ENDINGS, K.2.4 DAY AND NIGHT, K.2.5 DAYS, WEEKS, AND MONTHS, K.2.6 MOON WATCH, K.2.7 MOON PHASES, and K.2.8 SEASONS.

In CLOCKS AND CALENDARS the students compare the clocks and calendars they have made to date. The emphasis is on finding the periods of time measured and the similarities of purpose.

When to use

The activity should be undertaken near the end of the school year after the Seasons Clock has been completed.

STUDENT ROLES

Organizer
Reviewer
Chronologist

MATERIALS

Learning Calendar
markers
chart paper
grid paper, inch or centimeter
Day-and-Night Clocks
Moon Clocks
Seasons Clocks
assorted sample calendars

PRODUCTS

Class graph about clocks and calendars

PROCEDURES

1. **Review the Day-and-Night, Moon, and Seasons Clocks with the students. Have them compare the clocks.**

Ask such questions as these:

- Where does the Day-and-Night Clock begin? End?
- What happens when we get back to the beginning?
✓ Get at the idea that we begin again.
- Where does the Moon Clock begin? End?
- Where does the Seasons Clock begin? End?
- Which clocks are based on the sun? Moon? Other things in nature?
- How are the clocks alike? How are they different?

2. **Have the students compare the Learning Calendar with other calendars they have made or seen. Make a class graph to show the number of days measured by each one.**

Have them do the following:

- Arrange their calendars and clocks in order from shortest to longest time intervals.
✓ Help them include day, week, month, and year calendars, the Learning Calendar, the Home Learning Calendar, the Day-and-Night Clock, Moon Clock, Seasons Clocks, and so forth.
- Make a class graph showing the period of time represented on the various calendars and clocks.

3. **Summarize the class graph about clocks and calendars and compare natural clocks and calendars.**

Ask such questions as these:

- How are clocks and calendars alike?
- How are they different?

- Which are based on natural cycles? Which calendars are based on their usefulness?
 - ✓ Work to the idea that they are all based on natural cycles or some unit or period of time that people find useful. The Learning Calendar uses the school year, which is considered a useful time period for learning.
-

EXTENSION

Have the students explore and start to think about other natural clocks.

- Body clocks include heartbeat, breathing, eating and sleeping times, and so forth.
- Plant clocks include the blooming of some flowers and trees at specific times during the day or night. Many plants follow seasonal changes—some lose their leaves in the fall, some bud in spring, some fruit in a particular season, and so forth.
- Animal clocks include the making of sounds at specific times by birds and other animals. Some animals respond in special ways to seasonal changes—some grow fur or antlers, some migrate, and so forth.



**WEATHER
LOGOS
SP K.2.1**

Name _____

Date _____

WEATHER WORDS	WEATHER LOGOS
sunny	
rainy	
cloudy	



THROUGH THE
DAY AND NIGHT
SP K.2.4A

Name _____

Date _____

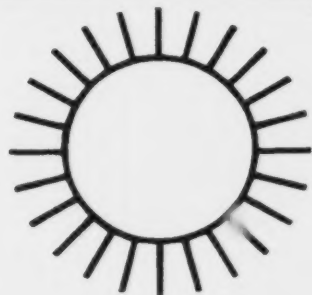
Day	Night



DAY AND NIGHT
SP K.2.4B

Name _____

Date _____





**DAYS AND
WEEKS
SP K.2.5A**

Name _____

Date _____

Color one square of each day
in a school week.

How many days are in a school week?

--

Color one square of each day
in a calendar week.

How many days are in a calendar week?

--



**DAYS AND
MONTHS
SP K.2.5B**

Name _____

Date _____

Name of month: _____

Color one block for each day
in a month.

How many days in this month?



MOON WATCH
SP K.2.6

Name _____

Date _____

Prediction				Observation		
I think it will be _____ days until the next full moon				I counted _____ days from one full moon to the next.		
full						



NEW MOON
SP K.2.7A

Name _____

Date _____

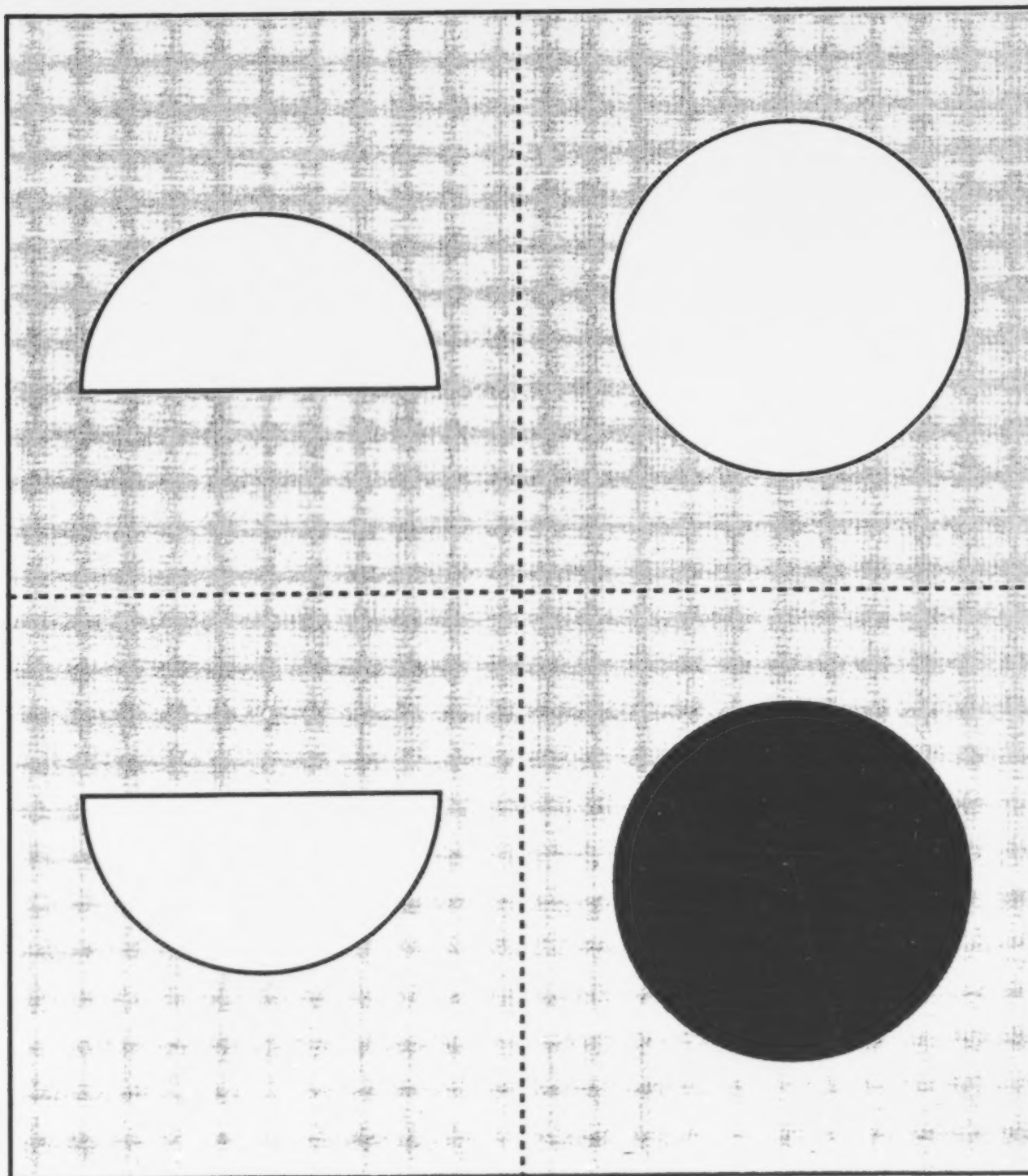
Prediction				Observation		
I think it will be _____ days until the next new moon .				I counted _____ days from one new moon to the next.		
new 						
						
						
						
						



SEQUENCE
CARDS
SP K.2.7B
Page 1

Name _____

Date _____

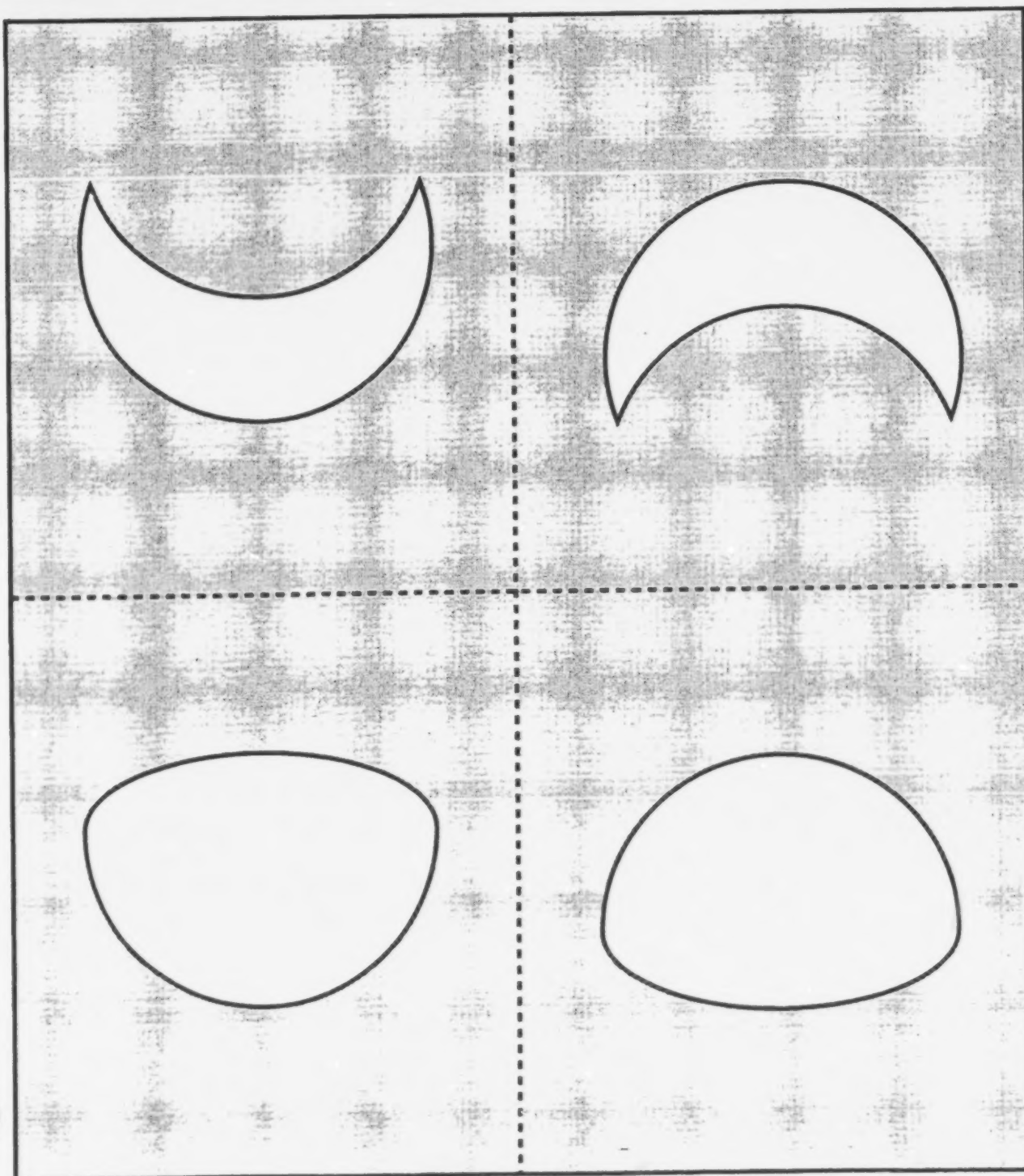




SEQUENCE
CARDS
SP K.2.7B
Page 2

Name _____

Date _____





MOON CLOCK
SP K.2.7C

Name _____

Date _____



MOON PHASES
SP K.2.7D

Name _____

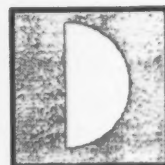
Date _____



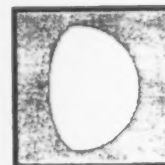
NEW: dark or very dimly lit at the edges



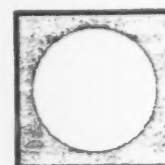
CRESCENT: smaller than half of the moon's face



QUARTER: half of the moon's face visible;
found in the first and last
quarters of the cycle



GIBBOUS: appears larger than a quarter moon
yet is not full



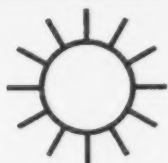
FULL: entire face of the moon is seen.



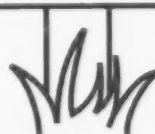
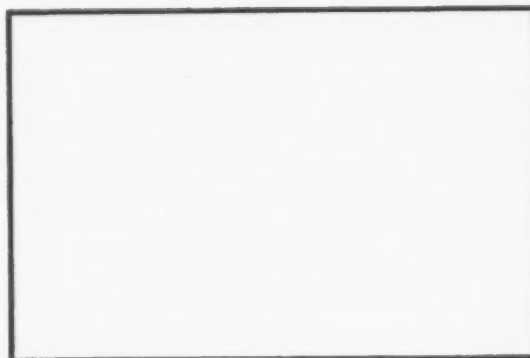
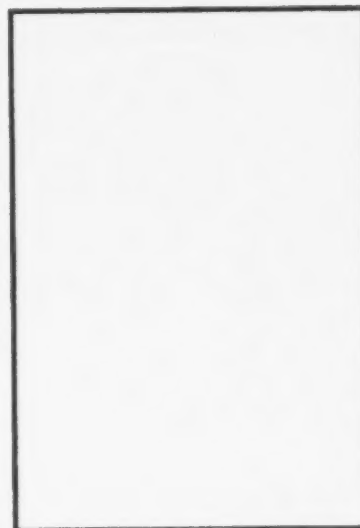
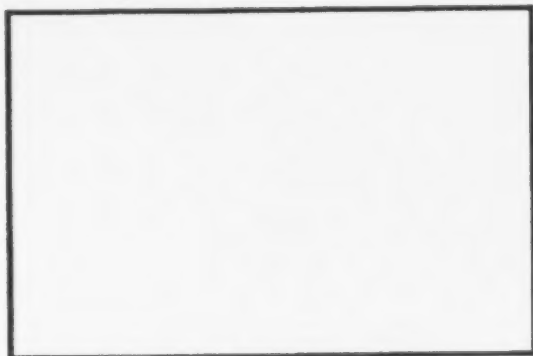
**SEASONS:
SUMMER SIGNS
SP K.2.8A**

Name _____

Date _____



Signs of Summer



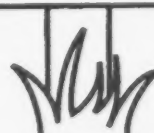
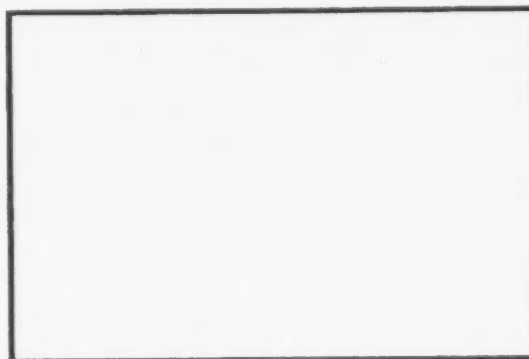
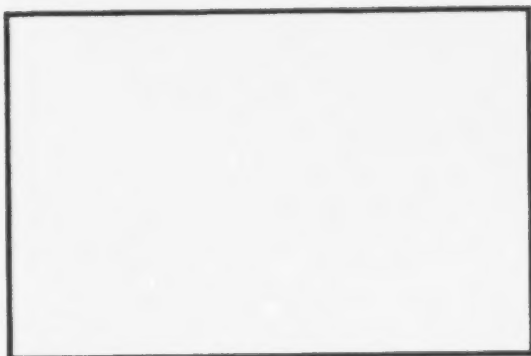


**SEASONS:
FALL SIGNS
SP K.2.8B**

Name _____

Date _____

Signs of Fall





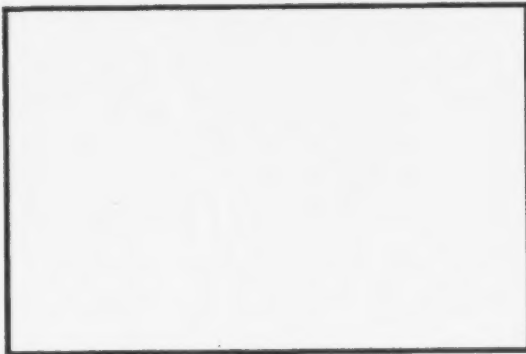
SEASONS:
WINTER SIGNS
SP K.2.8C

Name _____

Date _____

Signs of Winter

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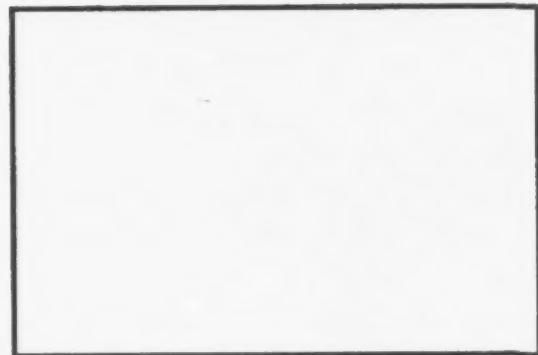


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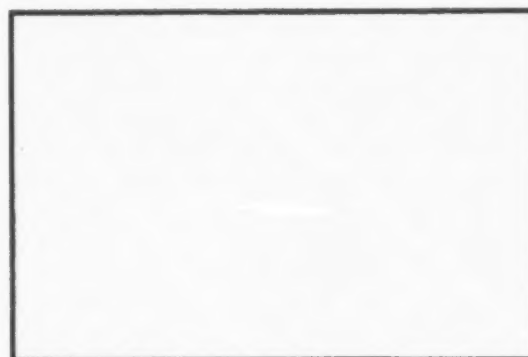
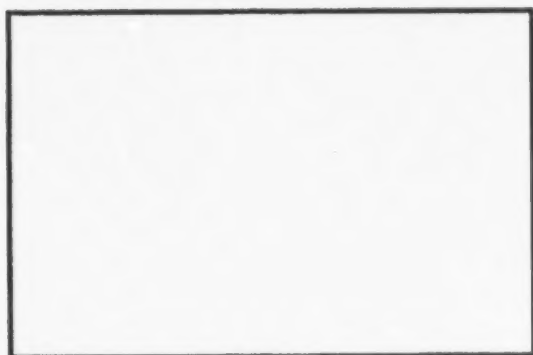


**SEASONS:
SPRING SIGNS
SP K.2.8D**

Name _____

Date _____

Signs of Spring





SEASONS

SP K.2.8E

Name _____

Date _____





**KINDERGARTEN
CLUSTER 3**

Animals

- K.3.1 Appropriate Pets
- K.3.2 Classroom Animals
- K.3.3 Caring for Classroom Animals
- K.3.4 Living and Not-Living
- K.3.5 Animals and Plants
- K.3.6 Animal Environments
- K.3.7 Animals That Help Us
- K.3.8 How Bugs Walk
- K.3.9 Parts of Bugs
- K.3.10 Parts of Mammals
- K.3.11 People
- K.3.12 Animals and Food
- K.3.13 Animals and Water
- K.3.14 Animals and Air
- K.3.15 Animal Wastes
- K.3.16 How Animals Keep Warm
- K.3.17 How Animals Keep Cool
- K.3.18 Real or Imaginary?



K.3.1 APPROPRIATE PETS

OBJECTIVES

The students

- Identify animals that are appropriate and inappropriate to keep in the home and classroom as pets

BACKGROUND

APPROPRIATE PETS is the first activity in the animal and pets sequence and is usually followed by Activities K.3.2 CLASSROOM ANIMALS and K.3.3 CARING FOR CLASSROOM ANIMALS.

When to use

APPROPRIATE PETS should be used when you decide to have animals in the classroom. Its focus is on thinking about what kinds of animals can be brought into the classroom and how they can be adequately cared for.

Animals for the classroom

Some animals make good pets, others do not. This may be due to their size, aggressiveness, special needs, or other factors. Some animals such as dogs make better pets for home. Other animals make better class pets. Some, such as rabbits, guinea pigs, turtles, and birds, do well in both places. Still other animals are best studied in their natural environment or for only a short time in the classroom. If you choose to have a pet, it will require care. The animal's needs must be considered and planned and provided for before it is brought into the classroom or the home.

Concept map

The students begin the study of animals by making a class concept map about pets. One method useful here is to write the term *Pets* in the middle of a piece of large chart paper. Have the students draw pictures about pets and their care. Cluster and glue drawings around subtopics under the term and draw lines to show connections. Lines can be drawn between individual drawings to show further connections. Also see the Background sections of Activities K.2.1 WEATHER WATCH and K.4.1 PLANT PARTS for additional information on concept mapping. Save the map about pets for later activities.

Focus Book

The Focus Book *A Surprise for Mom* can be used to introduce the problems associated with choosing a proper pet. Focus Books present ideas in Big Book format for discussion with students.

STUDENT ROLES

Animal caretaker
Zoo keeper
Zoologist
Biologist

MATERIALS

chart paper
3 x 5-in cards or small pieces of paper
Focus Book *A Surprise for Mom*
pencils, crayons, or markers
Student Page K.3.1 PETS

PRODUCTS

Concept map about pets
Completed Student Pages

PROCEDURES

1. **Help the students use pictures or drawings to make a class concept map about pets.**

Ask such questions as these:

- Does anyone have a pet?
- What kind of pet is it?
- Does anyone else have a pet? What is it?
- How are pets the same?
- How are pets different?
- What are some of the things you do for your pet?

- Does anyone else do other things for your pet? What do you do?
- What does your pet do for you?

2. Read and discuss the Focus Book *A Surprise for Mom*.

Ask such questions as these:

- Would a dinosaur make a good pet? Why?
- Would a snake make a good pet at home? At school?
- What would you have to do to have a snake for a pet at home?
- What would make a snake a good animal to study at school?
- What would you have to do if you wanted to have an insect for a class pet?
- What animals are good pets to keep at home? Why?
- What kinds of animals could you keep at school to study? Why?

3. Discuss releasing animals.

Ask such questions as these:

- Why would we put insects, frogs, and wild animals back into their natural home when we no longer are studying them?
✓ Get at the idea that these animals can take care of themselves.
- Why don't we release dogs, cats, or guinea pigs if we cannot take care of them?
✓ Get at the idea that these animals don't know how to take care of themselves. In some cases they become wild and can become destructive. If we cannot keep them, we should give them to someone who will care for them or give them to the Humane Society.
- Why is it important to carefully choose the kinds of animals we have as pets?

4. Help the students complete Student Page K.3.1 PETS.

Help them do the following:

- Draw or cut out pictures of pets.
- Classify these pet pictures as home or school pets.

- Draw or cut out pictures of animals that do not make good home or school pets.
 - Put the pictures of the animals on the student page.
5. **Help the students list animals they would like as classroom pets and go over the characteristics that make each animal a good pet.**
-

EXTENSION

- Have the students make a class book or chart of pets for home and school.



K.3.2 CLASSROOM ANIMALS

OBJECTIVES

The students

- meet and name their classroom pet
- start observation of animals

BACKGROUND

CLASSROOM ANIMALS is the second activity in the pet-and-animal sequence. It usually follows Activity K.3.1 APPROPRIATE PETS and precedes K.3.3 CARING FOR CLASSROOM ANIMALS.

CLASSROOM ANIMALS introduces students to animal biology and should be quickly followed by Activity K.3.3 CARING FOR CLASSROOM ANIMALS.

Animal selection

It is suggested that box turtles or herbivorous mammals such as rabbits or guinea pigs that can be handled by students be chosen as first classroom pets. Introduce birds and fish, which are more difficult to care for, later. The number of animals you choose for your classroom will depend on available space and number of caretakers, especially during weekends and vacations. If needed, write to the families asking for volunteer weekend pet caretakers.

Caution

There must be a concern for students with allergies. An animal almost always safe for allergic students is the box turtle. The students should always wash their hands after working with any animal.

Keeping animals

Most classroom pets can be kept and renamed from year to year without confusing the animals. Animals that are left with students over a summer are sometimes difficult to retrieve. Student caretakers can become very attached to them.

STUDENT ROLES

Biologist
Pet owner

MATERIALS

animals
cages
food
water
newspapers or litter
other supplies as required by the particular pets
name cards
felt pens
chart paper
Student Page K.3.2 CLASS PET

PRODUCTS

Animal names
Name cards for cages
Class book about pets
Completed Student Pages

PROCEDURES

1. Discuss home pets.

Ask such questions as these:

- Who has a pet?
 - ✓ Get a show of hands and note the number.
 - ✓ Comment on the amount of experience that can be drawn on in the care of pets.
- Who has a *male* or boy pet?
 - ✓ Get a show of hands and note the number.
 - ✓ Comment on the amount of experience with male pets.
- Who has a *female* or girl pet?
 - ✓ Get a show of hands and note the number.
 - ✓ Comment on the amount of experience with female pets.

- Who is not sure whether your pet is a male or female (boy or girl)?
 - ✓ Get a show of hands and note the number.
 - ✓ These last three questions will give a fair indication of how much teaching will be needed about the sex of animals.
- Who has a pet with a name?
 - ✓ Get a show of hands and note the number.
- Who takes care of the pet?
 - ✓ Get a sense as to whether the students, their parents, or others are caring for pets.
 - ✓ These last two questions will give some idea of how close the students are to their pets and what they are likely to know about pet care already.

2. **Introduce the classroom animals.**

Ask such questions as these:

- Does anyone know what kind of animal this is?
- How old do you think this animal is?
- Do you think it is a male or boy or a female or girl?
 - ✓ Tell the children which sex the animals is.
 - ✓ Showing or telling how it is possible to determine the sex of an animal may be undertaken here or later in Activity K.3.10
- What do you think this animal eats?
- How do you think it gets water?
- How should you handle this animal?
 - ✓ Demonstrate how to handle the pet.

3. **Name the animals.**

- Help the students name each animal as it is introduced into the classroom.
- Write the pet's name on a card and attach it to its cage.

- 4. Help the students begin a class book about classroom pets. Have them use Student Page K.3.1 CLASS PET.**

Help them do the following:

- Record the name of the pet, what kind of animal it is, its sex, age, and so forth.
 - Record why the animal makes a good pet.
 - ✓ Build on the ideas presented in Activity K.3.1 APPROPRIATE PETS.
 - Record their observations about the class pet.
 - ✓ Have the students illustrate their observations.
 - Repeat these procedures whenever a new pet is brought into the classroom.
-

EXTENSIONS

- Have the students visit a pet store and report on the animals they find and how they are cared for.
- Have a class pet day when the students bring their pets from home. Invite parents to attend.



K.3.3 CARING FOR CLASSROOM ANIMALS

OBJECTIVES

The students

- take turns in caring for pets and other animals in the classroom
- learn about personal hygiene
- create a working definition of pet

BACKGROUND

CARING FOR CLASSROOM ANIMALS is the third activity in the pet-and-animal sequence. It usually follows Activities K.3.1 APPROPRIATE PETS, K.3.2 CLASSROOM ANIMALS, K.6.5 GERMS, K.6.6 WASHING HANDS and K.6.8 APRONS. CARING FOR CLASSROOM ANIMALS is a natural companion to Activity K.3.15 ANIMAL WASTES, which can be done concurrently or shortly after it.

Care of animals

Classroom animals should be taken care of by the students. That way the students learn how to handle, feed, and care for the animals. Caring for pets should be added to the Class Responsibility Chart. Prior to starting this activity the students need to be introduced to personal hygiene through Activities K.6.5 GERMS and K.6.6 WASHING HANDS. They will need plastic aprons and gloves for cleaning cages. See Activity K.6.8 APRONS.

Demonstrations

Show how to handle and care for the animals as the students work together in groups of 4 to 6. They will need considerable supervision in the beginning. The need for supervision will decrease as they gain experience. Animal care should be a privilege and fun. Early supervision can promote enthusiasm for taking care of the animals. Once a group of students have learned how to care for an animal, they can teach another group.

STUDENT ROLES

Animal caretaker
Zoologist

MATERIALS

animals
food
water
cages
special supplies as required for a particular pet
newspapers
plastic protective gloves
other gloves as needed
plastic aprons from Activity K.6.8 APRONS
concept map about pets from Activity K.3.1 APPROPRIATE PETS
Working Dictionary
Student Page K.3.3 CARING FOR OUR PET

PRODUCTS

Well-cared-for animals
Class charts about pet care
Responsibility Chart
Class book about pets begun in Activity K.3.2 CLASSROOM ANIMALS
Working definition of pet
Completed Student Pages

PROCEDURES

1. **Show small groups of students how to handle each kind of classroom animal.**
 - Approach the animals slowly with *no* quick movements.
 - Give support to the animal's body when lifting it.
 - Pet by stroking the animal in the direction in which the fur naturally falls.
 - Return the animal to its cage often so that it can get water, eat, and relax.

2. Show small groups of students how to feed and water each kind of classroom animal.

- Have commercial foods available for the animals. Some animals need fresh foods also.
- Many animals should have food available all day so they can eat when they are hungry.
- Animals need fresh water daily.

3. Show the students how to maintain cages.

- Animals need a clean environment.
- Cages should have elevated wire floors so feces and urine pass through.
- There should be newspapers and/or a pan placed underneath the cage to catch the animal's waste.
- Cages should be cleaned daily to prevent unwanted odors.
- Food pellets should be in a container so they aren't lost through the floor of the cage.
- Water should be changed every day.
- The cage should be large enough for the animal to exercise.
- Provide an exercise wheel if the animal is active.
- The cage should have a door that can be closed and secured so the animal cannot get out.

4. Set standard procedures and supervise the carrying out of tasks.

Have the students do the following:

- Wash their hands before handling the animals.
- Wear an apron while cleaning the cage. Washable or throw-away protective gloves should also be used. See Activity K.6.8 APRONS.

- Be sure that all used papers are put in a proper container for disposal.
 - Sweep or mop up any spills in the pet area.
 - Store extra supplies.
 - Clean and store washable gloves and aprons after cleaning a cage.
 - Wash their hands when everything is completed.
5. **Begin Activity K.3.15 ANIMALS WASTES and use biological words so that the students learn the language of body functions.**
 6. **Make a chart about pet care listing jobs to be done in caring for animals. Have the students illustrate the chart. Post it near the cage.**
 7. **Add jobs to the Class Responsibility Chart.**
 8. **Add information about handling, care, and needs to the class book about pets started in Activity K.3.2 CLASSROOM ANIMALS.**
 9. **Have a follow-up discussion after several months. Help the students with Student Page K.3.3 CARING FOR OUR PET.**

Ask such questions as these:

- Why do our animals have to be fed?
- When do our animals have to be fed?
- How are wild animals fed?
- When are you fed?
- When must animals get water?
- How do our animals get water?
- When do you get water?
- Why do you clean the cage?

- How do you clean the cage?
- When does the cage need to be cleaned?
- How does the animal get exercise?
- When should the animal exercise?
- When do you exercise?
- When should you hold or pet the animal?
- How do you hold and pet the animal?
- What should you add to our concept map about pets?

10. Have the students add to their concept map about pets and create a working definition of pet for their Working Dictionary.

EXTENSION

- If the pet is a baby, have the students keep a pictorial record of changes as it grows. Help them include measurements.



K.3.4 LIVING AND NOT-LIVING

OBJECTIVES

The students

- collect living and not-living things
- identify similarities and differences between living and not-living things
- define living, not-living things, once-living, and never-living things

BACKGROUND

LIVING AND NOT-LIVING is one of the activities about classification. It flows out of Activities K.1.7 SAME AND DIFFERENT, K.1.8 PHYSICAL CHARACTERISTICS OF THINGS, K.1.9 FUNCTIONS OF THINGS and leads to or is done concurrently with K.3.5 ANIMALS AND PLANTS.

Student's background

LIVING AND NOT-LIVING initiates thinking about a basic scientific question, What distinguishes living things from not-living things? Most students come to school with some understanding of the words *alive* and *not alive*. This activity is based on that understanding. A third and a fourth category, *once-living* and *never-living things*, will emerge as the students collect bits of metal and rocks that never lived and dead things or things made from dead things—lumber, leather, coal, and so forth.

Organization

This activity is usually done with the participation of the entire class. Student pairs work well for field work.

Starting time

LIVING AND NOT-LIVING can be done any time that there are living plants and animals available for the students to collect, usually in the early fall and spring.

Care of living things

To instill a respect for life, it is important that students return any living animals to the place they were found. Small flags made of skewers and pieces of fabric, paper, or yarn put at the spot where animals were found to will help ensure that they are returned to the right place.

Working definitions.

Working definitions for these complex ideas are always difficult to work through. If sentences do not flow easily, list ideas in the Working Dictionary that may later become full definitions. Here it is enough to get beginning definitions of living and not-living.

STUDENT ROLES

Philosopher
Biologist

MATERIALS

chart paper
markers
glue
tape
small resealable plastic bags
clean 1/2-pint milk cartons or clear plastic cups
recycled nylon hose
skewers to make flags
small fabric, paper, or yarn streamers to make flags
Working Dictionary
Student Page K.3.4 LIVING AND NOT-LIVING

PRODUCTS

Class chart about living and not-living things
Working definitions of living and not-living
Completed Student Pages

PROCEDURES

1. **Introduce the question of how we can tell the difference between things that are alive and things that are not alive. Then have the students collect examples of living and not-living things. Explain how they are to put their items in containers.**
 - To introduce the question, show the students an example of something that is living and something that is not-living and ask the students whether the samples are *alive* or *not alive*.

- ✓ Briefly explore reasons for their answers.
 - ✓ Do not overdiscuss their responses at this point. Let the collections they will make speak for them.
- Ask the students to mark where they collect their living thing with a flag so they can return it to its home later.
 - ✓ Show them how to tie a streamer on a skewer to make a flag.
 - Pass out clean milk cartons, cups with covers, or other containers to hold the things they will collect.
 - Ask the students to go outdoors and work in pairs. Have each pair collect one *living* and one *not-living* thing.
- 2. After they have made their collection, have the students place their objects in one of two groups, one for living things and one for not-living things.**
- Have the students tell why they think their object is alive or not.
 - Have the students describe the differences and similarities between living and not-living things.
 - ✓ Record their ideas in lists on chart paper or the chalkboard.
- 3. Help the students distinguish between not-living things that were once living and not-living things that were never living.**
- After the collection has been categorized into living and not-living things, pick up a stick or dead leaf from the not-living category and ask why we don't call it "living."
 - ✓ Observe that it came from something that was alive or living.
 - ✓ Work to the idea that we can call it "not-living" because it is not living now.
 - Create a third category of once-living, dead, or used-to-be-living things.
 - When once-living things have been identified pick up a rock, piece of metal, or other never-living object and ask whether it was once living.
 - Ask, If a thing is not living and was never living, what can we call it?
 - ✓ Work to the idea of calling it "never-living."

4. **Make a class chart about living and not-living things and divide the not-living things into two columns, once-living and never-living. Use Student Page K.3.4 LIVING AND NOT-LIVING as a model.**

Help the students do the following:

- Rearrange the things they have collected and place them in one of three categories—living, once-living, and never living.
 - Return animals to the place they were found.
✓ Be sure they bring back the marker flags.
 - Label the empty containers with the name and picture of the animal collected. Glue or tape the containers to the chart along with the plants and other objects they have collected.
✓ If Activity K.3.5 PLANTS AND ANIMALS shortly after this activity, the collection can be used again, so don't glue the containers at this time. See Activity K.3.5, Procedure 2.
 - Add new examples to the chart as the students collect them.
 - Draw or cut out pictures of living, once-living, and never-living things and glue them on their individual student pages.
5. **Have the students create working definitions of living and not-living things. Review the meaning of a working definition. See Activity K.1.10 THE WORKING DICTIONARY AND WORKING DEFINITIONS.**

Working definitions may include such ideas as these:

- *Living things* are things that make seeds and babies that grow into things like themselves.
✓ This is a beginning definition with a category name and a function.
- *Living things* are things that need water and grow. Some need food, and some can move about on their own.
✓ This is a beginning definition with a category name and functions.
✓ It will be useful to come back to this definition after Activities K.3.12 ANIMALS AND FOOD, K.3.13 ANIMALS AND WATER, K.3.14 ANIMALS AND AIR, and K.4.5 PLANTS AND WATER have been done.

- *Living things* are made of meat or wood.
✓ This is a beginning definition with a category name and forms.
- *Not-living things* do not need water, air, or food to exist.
- *Not-living things* are not made of meat or wood.

EXTENSIONS

- Help the students act out the rhyme below or turn it into song or rap.
- Have the students compare what the rhyme says with their own observations about living, not-living, once-living, and never-living things.

Living and Not-Living Things Rhyme

Living things we all do know
By the ways we see them grow.
From eggs and seeds,
And up-springing weeds,
They're all around us wherever we go.

Not-living things are easy to find.
They have no needs of any kind.
They sit and wait
Till moved by fate
Or are used for things that we've designed.

Never-living things are not-living things
Like metal, and stone, and water in springs,
They rust and wear
And make up air
And walls and boats and playground swings.

Once-living things are not-living too.
They're parts of things that once lived and grew.
Some just decay
And crumble away.
Others we make into things that are new.

Fig. K.3.4 Living and Not-Living Things Rhyme



K.3.5 ANIMALS AND PLANTS

OBJECTIVES

The students

- identify similarities and differences between plants and animals
- create working definitions of plants and animals

BACKGROUND

ANIMALS AND PLANTS is the last of five activities about classification. It flows out of Activities K.1.7 SAME AND DIFFERENT, K.1.8 PHYSICAL CHARACTERISTICS OF THINGS, K.1.9 FUNCTIONS OF THINGS, and K.3.4 LIVING AND NOT-LIVING. Having categorized living and not-living things, the students now further subdivide living things into plants and animals. ANIMALS AND PLANTS is best done concurrently or shortly after K.3.4 LIVING AND NOT-LIVING.

Developmental nature of task

In ANIMALS AND PLANTS living things are categorized as either plants or animals. In this activity the students compare the differences between plants and animals and define these two terms. The activity builds on the students' previous experience with plants and animals. Remember that we are producing definitions based to the students' present experience, and experience will increase over time.

For many students it will take considerable time and reinforcement before there is a clear separation of living from not-living things. Animals and plants present less of a problem.

Concept maps

It is important that two separate concept maps be created, one for plants and one for animals. These can be added to in later studies. Be sure to keep these two maps for this purpose.

Practicality of working definitions

In thinking about classification, it will help to recall that in the scientific community there are still entities such as the virus that arguably can be classified as either living or not-living. Even the division of organisms into the simple dichotomy of Plant and Animal Kingdoms is

not adequate for working biologists who now see five or more kingdoms. However, for the beginner these problems will be meaningless. The basic Plant and Animal Kingdom classification scheme introduced here will provide grounding in a language very much alive in the professional world of biologists. Using working definitions to shape students' thinking will ready them for extending categories as they become more experienced.

STUDENT ROLES

Biologist
Botanist
Zoologists
Taxonomist

MATERIALS

chart paper
only if a new plant and animal collection is to be made:
felt pens
glue
tape
small resealable plastic bags
clean 1/2-pint milk cartons or clear plastic cups
recycled nylon hose
skewers
small fabric or yarn streamers.

Working Dictionary

Student Page SP K.3.5 PLANTS AND ANIMALS

PRODUCTS

Concept map about animals
Concept map about plants
Working definitions of plants and animals
Class chart about plant and animal similarities and differences
Completed Student Pages

PROCEDURES

1. **Help the students make separate concept maps about animals and plants.**

Help them include such things as these:

- Kinds of plants and animals.
- Needs of plants and animals.
- Where they are found or live.
- How they are used and what they do.

2. Have the students classify the collection they made in Activity K.3.4 LIVING AND NOT LIVING or quickly make another collection of plants and animals.

Ask the students such questions these:

- How can we divide our collection into two smaller collectionS?
 - ✓ Work for a division into living and not-living things.
 - ✓ Have them sort the collection into living and not-living things.
 - ✓ Review why they consider the items living and not living.
- How can we divide the living things into two smaller collections?
 - ✓ Work for a division into animals and plants.
 - ✓ Have them sort the collection into animals and plants.
 - ✓ Have the student use Student Page K.3.5 to give examples of plants and animals.

3. Discuss and make a chart about similarities and differences in plants and animals and among themselves.

Ask such questions as these:

- What things are similar about the plants and animals in the collection?
 - ✓ Get at such things as they all seem to grow, reproduce, and need water.
- What things are different about the plants and animals in the collection?
 - ✓ Get at such things as they are made of different materials—animals meat and bone and plants woody and paper-like materials. They have different body parts and animals can move from place to place by themselves while plants can't.
- What things are similar about the plants in the collection?
 - ✓ Get at such things as they are made of the same kinds of woody and paper-like materials; they produce seeds that grow

into new plants: they need water; many have leaves, roots, stems, and flowers; and so forth.

✓ The plants that the students know will usually be flowering plants, and they will have the characteristics listed above. The students are getting at a beginning definition that will be changed over time when any early generalization will be corrected.

- What things are different among the plants?
✓ Get at such things as they look different in size, shape, often color, and may have different parts.
- What things are similar among the animals in the collection?
✓ Get at such things as they all are made of the same kinds of materials—meat and hard parts such as bones, shells, insects' scovering or exoskeletons; they need water; they grow and reproduce or have babies that grow to look like their parents; they move from place to place by themselves; and they have eyes, legs, mouths; and so forth. Again the students are working for a beginning definition that will be changed over time when early generalization can be corrected.
- What things are different among the animals?
✓ Get at such things as they look different in size, shape, often color, and sometimes in body parts.

4. Help the students create working definitions of plants and animals using their concept maps. Record the definitions in the Working Dictionary.

Definitions might include such things as these:

- Plants are living things that produce seeds, have leaves, and so forth. They are made of woody and green paper-like material. They grow and reproduce.
✓ Don't be concerned that not all plants are green or that there are other exceptions to their definitions. These are beginning working definitions.
- Animals are living things made of meat, skin, hard parts (bone, shell, and so forth). Animals produce eggs or babies, move about, and grow.

EXTENSIONS

- Have the students act out the rhyme below or turn it into song or rap.
- Have the students compare the rhyme what the rhyme says with what they have observed about plants and animals.
- Have the students list the body coverings of animals.

**Plant and Animal
Rhyme**

Plants are living things that grow
From shoots and seeds that we can sow.
They've got stems and roots
And flowers and fruits
And get water from the ground below.

Animals too are living things
And move with fins or feet or wings.
They drink and eat
They're made of meat
And fight with teeth and claws and stings.

Fig. K.3.5 Plant and Animal Rhyme



K.3.6 ANIMAL ENVIRONMENTS

OBJECTIVES

The students

- discover where different kinds of animals live
- compare animal environments
- create a working definition for environment

BACKGROUND

ANIMAL ENVIRONMENTS is the first in a series on basic biological needs. It looks at animals' need for a place to live. It usually follows Activity K.3.5 ANIMALS AND PLANTS and precedes Activities K.3.12 ANIMALS AND FOOD, K.3.13 ANIMALS AND WATER, K.3.14 ANIMALS AND AIR, K.3.15 ANIMAL WASTES, K.3.16 HOW ANIMALS KEEP WARM, and K.3.17 HOW ANIMALS KEEP COOL.

In ANIMAL ENVIRONMENTS the students first work with the teacher to make a concept map of animal environments. They then make a big book of animals in different environments, and finally create a working definition of environments.

Needs for special environments

Different animals live in different environments or habitats. Animals are found in particular environments depending on their special needs. ANIMAL ENVIRONMENTS is designed to associate animals with particular environments. It also introduces the special ability of humans to live in many diverse environments, including space.

Experience to draw on

Almost always the students will have seen animals in gardens, forests, ponds, or lakes, at home or in school, museums, zoos, or on farms. They also will have seen animals on TV or in books and magazines. To start the search for environments, use this experience.

Big Book

For the class book about animals and environments, use a Big Book format to incorporate examples of animals in different environments. The book can be added to at any time.

Sources of pictures.

In addition to the students' own drawings, pictures from natural history magazines, stencils, and coloring books can be used. You may be able to download pictures from the Internet, print, and photocopy them. The pictures can be colored by the students.

STUDENT ROLES

Naturalist
Ecologist
Zoologist
Artist
Publisher

MATERIALS

glue
paper
crayons or markers
scissors
magazines and other sources of animal pictures
Working Dictionary
Student Page K.3.6 ANIMAL ENVIRONMENTS

PRODUCTS

Class book about animals and environments
Concept map about animal environments
Working definition of environment
Completed Student Pages

PROCEDURES

1. **Discuss animals and their environments and have the students build a concept map about animals and environments with you. Illustrate and label the students' contributions.**

Ask such questions as these:

- What animals did you collect for your chart about plants and animals in Activity K.3.5 ANIMALS AND PLANTS?
- In what kinds of places do these animals live?
 - ✓ If needed, ask whether any of the animals live in houses, jungles, forests, ponds, farms, schoolyards, and so forth.
 - ✓ Identify these living places as *environments*.
- What do different environments have that animals need to live?
 - ✓ Get at food, water, hiding places, and so forth.
- What is a forest environments like?
 - ✓ Work to such things as covered by trees, dark or shadowy ground, leaf-covered ground, moss-covered trees, poison oak, and so forth.
 - ✓ Explore their understanding of other environments the same way—farms, gardens, beaches, jungles, and so forth.
 - ✓ When possible, have the students suggest the environments.

2. Assemble the materials for a class book about animals and environments. Use Student Page K.3.6 ANIMAL ENVIRONMENTS or create different page format.

- Draw circles in chalk on the floor or on large sheets of paper and label them with the names of environments.
 - ✓ An environment might be the ocean, a forest, the classroom, and so forth.
- Have the students use Student Page K.3.6 for drawing or pasting cut out pictures of animals. Put these in the appropriate circle.

3. Discuss animals in different environments.

Ask such questions as these:

- Can some animals live in more than one environment? What animals are they? What about people?
 - ✓ Add animals as needed.
- Can some animals live in *all* of the environments? What are they? What about people?
- Are there some animals that can live only in very special environments?

- ✓ Get at such animals as fish, birds in the sky, jungle animals, Arctic animals, endangered species, and so forth.
- Are all the pictures of animals you have found alive today? Which, if any, are not alive today?
 - ✓ Separate out dinosaurs, Ice Age animals, and imaginary animals.
 - ✓ Create an ancient environment circle, an imaginary environments circle, and so forth as needed.
- 4. **Compile an class book about animals and environments from the collections of drawings and pictures. Help the students with labeling.**
- 5. **Help the students define environment and record their working definition in the Working Dictionary.**

The following are some possible definitions.

- An *environment* is all the things around something or somebody.
- An *environment* is all the things in and about place such as the kinds of plants and animals, the temperature, the water, the air, the land, and so forth.

EXTENSIONS

- Have the students add to the class book about animals and environments whenever they come up with new examples.
- Have the students describe their home as an animal environment.
- Set up a dinosaur center and have the students draw or make environments for models of different dinosaurs.



K.3.7 ANIMALS THAT HELP US

OBJECTIVES

The students

- identify ways people depend on animals
- look for reasons to appreciate animals

BACKGROUND

ANIMALS THAT HELP US deals with the unique capacity of humans to make use of and to think about the contributions of other living things to their well-being. Much of our human development has been possible because we have been able to use animals to work for us. It is in part because of our appreciation for this contribution that we are concerned for their well-being.

People use animals and animal products in many ways. This activity introduces the students to ways people are dependent on animals. The students illustrate their lists by drawing and cutting out pictures of animals that help us. These lists can be added to throughout the year.

Concept map

Help the students expand the concept map about animals developed in Activity K.3.5 ANIMALS AND PLANTS. Additions will give the students a sense of their expanding understanding and experience in making connections.

STUDENT ROLES

Ecologist
Anthropologist

MATERIALS

floor chalk
 masking tape
 scissors
 glue
 chart paper
 concept map about animals from Activity K.3.5 ANIMALS AND PLANTS
 Student Page K.3.7 ANIMALS THAT HELP US

PRODUCTS

Expanded concept map about animals
 Class chart about animal uses
 Completed Student Pages

PROCEDURES

1. **Help the students add things that animals do for us to the concept map about animals from Activity K.3.5 ANIMALS AND PLANTS.**

Help them include such things as these:

- Things that animals provide us such as friendship, transportation, work, food, clothing, research study to tell us about ourselves, enjoyment in watching them, and so forth.
- Specific animals that help us—horses, cows, dogs, class pets, and so forth.
- Places where animals help us.

2. **Help the students make a chart about animal that help us. Have them use Student Page K.3.7 ANIMALS THAT HELP US.**

- Mark circles on the floor or a table and label them with categories of uses.
 ✓ Friendship, transportation, work, food, clothing, and so forth.
- Have the students work in small groups to draw or collect pictures of animals that fit their assigned category of help.
 ✓ Some animals may belong to several categories.

- Have them cut out their drawings or other pictures and glue them on individual student pages that can be attached on a class chart or in a book.

3. Add more categories when the students find other ways animals help us.

Some possible additional categories might be animals that do the following:

- Eat trash (flies, ants, termites, and others).
- Make soil (worms, termites, and others).
- Eat bugs that hurt crops (ladybugs, wasps, and others).

4. Summarize the contribution of each animal to people's lives.

Ask such questions as these:

- According to the chart, how does this animal help us?
✓ Go over the animals listed.
- Where is the animal found?
✓ When students find new animals, have them add these to their book about animals and their environments started in Activity K.3.6 ANIMAL ENVIRONMENTS.
- If animals are so useful to us, how should we treat them?
✓ This provides an opportunity to discuss how well the students have been carrying out their responsibilities to their classroom animals.

EXTENSION

- Keep the class chart about ways animals help us in an activity center and add to it throughout the year.



K.3.8 HOW BUGS WALK

OBJECTIVES

The students

- are introduced to the study of external bug body parts and their functions
- compare insects, spiders, isopods, centipedes, and millipedes by their leg counts
- use simulations to help predict ways they will find that bugs can walk

BACKGROUND

HOW BUGS WALK is one of four activities on external anatomy. It is usually followed by Activity K.3.9 PARTS OF BUGS. Other activities in the series are K.3.10 PARTS OF MAMMALS and K.3.11 PEOPLE.

Predicting leg motion

This activity is designed to introduce the body structure of insects and their relatives. The students simulate the walking of bugs and then predict the ways they will find that bugs actually walk. They test their predictions in K.3.9 PARTS OF BUGS. Through the simulation they will begin to get a sense of the segmented nature of bugs.

Bugs as a category

"Bugs" is a convenient, collective, and common name for the organisms introduced here. It represents the major division of the animal kingdom called Arthropoda, which includes the animals studied in the activity—insects, spiders, crustaceans, centipedes, and millipedes.

There is a technical problem in using the common name "bugs." One of the orders or subdivisions of insects is called "bugs" or sometimes "true bugs." This order includes the lace bug, stink bug, and the water boatman. This complication is not ignored in *DASH*; it is simply not fully explored in kindergarten. It is the intent of *DASH* to introduce both common and technical words because the students live with both common and technical names.

Biology of the rhyme

Arthropods include six living classes. The most common five are referred to in the rhyme. See Fig. K.3.8. All arthropods have segmented bodies of more or less distinct parts. These parts are covered by an exoskeleton much like jointed pieces of armor. The exoskeleton is a tough, thin shell, and the muscles that move it are attached on the inside of the shell. This arrangement is quite different from our bodies where the skeleton is on the inside and the muscles are outside the skeleton.

The common five classes have different numbers of walking legs, and this feature is captured in the rhyme.

- *Insecta* or *insects* have 6 legs—beetles, butterflies, moths, and ants.
- *Arachnids* have 8 legs—spiders, horseshoe crabs, scorpions, and ticks.
- *Crustaceans* have 10 to 20 legs—crayfish, lobsters, barnacles, and isopods such as pill bugs sometimes called sow or roly-poly bugs.
- *Chilopods* or *centipedes* have 48–60 legs.
- *Diploids* or *millipedes* have 80–400 legs.

All these arthropods have mouth parts, some for crushing, some for sucking. All have eyes, and all but the spiders have antennae.

Use of the rhyme

Have fun with the rhyme. It provides the information base to support the simulation of bugs walking. By linking bodies, the students get a sense of the segmented nature of the bugs. Rhyme, rap, music, chant, and body motion all enhance memory.

STUDENT ROLES

Entomologist
Dancer

MATERIALS

chart paper
markers
sticks or cardboard tubes
"We Are Bugs Rhyme"

PRODUCTS

Bug walks
Chart about the ways bugs walk

PROCEDURES**1. Ask the students questions about their experiences with bugs.**

Ask such questions as these:

- Where have you found bugs?
- What does a bug look like?
- Are all bugs alike?

2. Read the rhyme "We Are Bugs."**3. Discuss the rhyme and have the students demonstrate the body parts of bugs.**

Ask such questions as these:

- What are bugs?
- Who are entomologists?
✓ Note that *entomologists* are scientists who study arthropods or bugs.
- How might we tell an insect from a spider? From a crustacean? From a centipede? From a millipede?
- What do insects have on their heads?
- What might the antennae be used for?
- Do you know of another kind of antenna?
- How might a TV antenna be like a bug's antenna?
- What might a bug use its eyes for?
- What might a bug use its mouth for?
- What kinds of sounds do bugs make?
- How do bugs get around from place to place?

4. Read the rhyme again and explore the way insects might walk.

- Help student groups of 3 form an insect with 6 legs.
 - ✓ The first person uses his or her arms as antennae.
 - ✓ The second person wraps his or her arms around the waist of the first person and provides the second pair of legs.
 - ✓ The third person does the same for the third pair of legs.
- Have the groups experiment with ways of walking.
- Have the groups demonstrate how they think insects might walk.

5. Continue the exploration of the walking problems of other bugs.

- For spiders, add 1 person to the previous insect group.
 - ✓ Spiders will not have antennae, a piece of information you will probably have to provide.
- For a crustacean such as a crayfish, go to 5 students.
 - ✓ Crayfish have antennae as do the rest of the arthropods.
- For an isopod such as a pill bug (sow bug or roly-poly) with 14 legs, 7 students will be needed.
 - ✓ Bring out the idea that we are adding segments to which the legs are attached.
- For a centipede, use the whole class. Though "centipede" indicates something that has 100 legs, most centipedes have only 48-60 legs. Each additional person is another segment in the body.
- For a millipede, have each student be 1 body segment with 2 pairs of legs. Arms can be extended to the floor with sticks or cardboard tubes to act as another pair of legs.

6. Raise some further questions for investigation.

Ask such questions as these:

- How do you think real insects, spiders, centipedes, and millipedes walk?
- How could you find out?

7. Make a two-column chart, one for predictions and one for observations about the way different kinds of bugs walk.

- Use such descriptions as these:
 - ✓ "All legs move together: all legs go forward or backward at the same time."
 - ✓ "Opposite sides move together: legs on one side move forward while the legs on the other move backward."
 - ✓ "Legs do not move together: legs move independently."

8. Proceed to Activity K.3.9 PARTS OF BUGS where the students observe the walk of bugs.

EXTENSION

- Have the students simulate the walk of two- and four-legged animals.

WE ARE BUGS RHYME PART 1

Refrain

We are bugs, bugs, walking up and down again.
Bugs, bugs, flying all around again.
Bugs, bugs, digging in the ground again.
Bugs, bugs, listen to our sound again.

Stanza

Bugs is the name we are commonly called,
A name that leaves entomologists galled.
Arthropods they claim
Is really our name,
So you'll learn both and they won't be appalled.

Refrain

Stanza

Our bodies are shells, segmented and firm,
Though some larvae are soft, just like a worm.
We have lots of legs,
And we all lay eggs,
And many of us live for a very short term.

Refrain

Stanza

We are known by the walking legs we inherit.
Insects have six, that's all that they merit.
Spiders have eight.
Now the number gets great
As a *crustacean* needs 10 to 20 to bear it.

Refrain

WE ARE BUGS RHYME PART 2

Stanza

Next comes the very fierce *centipede*.
Its name is most impressive indeed.
But it really does cheat,
And has not a hundred feet.
Only some 50 or 60 it really does need.

Refrain

Stanza

Now the leg count gets bigger still,
With up to 400 legs to drill,
And the long *millipede*
Walks quickly indeed
As it moves about with obvious skill.

Refrain

Stanza

Antennas can stick out of our head,
And our eyes may be white, green, or red.
Some mouths are like straws,
Some great crunching jaws,
Odors we follow that we may be fed.

Refrain

Stanza

There are very few things that we won't eat,
Be it vegetables, fruit, paper, or meat.
We clean up your mess,
Without us we'd guess
Decomposition would never be complete.

Refrain

Fig. K.3.8 Bug rhyme



K.3.9 PARTS OF BUGS

OBJECTIVES

The students

- identify external bug body parts and their functions
- observe how different kinds of bugs walk

BACKGROUND

PARTS OF BUGS is part of a series of activities on external anatomy. It usually follows Activity K.3.8 HOW BUGS WALK and precedes K.3.10 PARTS OF MAMMALS and K.3.11 PEOPLE.

Parts of bugs

In Activity K.3.8 HOW BUGS WALK the students are introduced to five different kinds of "bugs" or arthropods and some of their characteristics and they simulate their walking. Now they identify the external body parts of bugs by going into the field and observing bugs where they live. This is a good time to take a further look into how bugs walk.

This is a two-part study. In the first part, the students observe various bugs (insects, spiders, crustaceans, and so forth) in the field. In the second part they bring insects into the classroom to study them in detail.

Possible observations

See Table K.3.9 for help in identifying the external parts of bugs. Don't expect the students to find all body parts at this time. Though most of them will quickly pick up new words, this is not a vocabulary lesson, and they should concentrate on the nature of the structures rather than the particular names.

Table K.3.9 Central body parts of bugs

Name	Central Body Parts	Walking Legs	Antennas	Wings	Eyes
Insects	3 parts: head, thorax, abdomen	6	Yes	Sometimes	Yes
Spiders	2 parts: cephlothorax abdomen	8	No	No	Yes
Crustaceans	2 parts: cephlothorax abdomen	10-20	Yes	No	Yes
Centipedes	head and 24-30 body segments	48-60	Yes	No	Yes
Millipedes	head and 20-100 body segments	80-400	Yes	No	Yes

Handling and housing bugs

Have the students use a spoon to pick up the bugs and put them into containers. To keep the bugs from escaping, the mouths of the containers should be covered with nylon hose or plastic wrap with holes to allow air to enter. Clear plastic containers can be used for easy viewing.

Have the students use flags on skewers to mark where the bugs they collect were found. Have them return the bugs to their environment as soon as possible.

Magnifying lenses

Have the students practice with their magnifiers before they go into the field. Help them explore to discover the following:

- how to focus their magnifier by moving it up and down
- how close they must get their eye to the magnifier
- how different magnifiers provide different amounts of magnification

Bug models

Models of insects and other bugs can be made from a great variety of recycled materials, glue, and tape. Put materials into an Inventor's Box that will appeal to the imagination of the students.

STUDENT ROLES

Entomologist
Zoologist
Biologist

MATERIALS

resealable plastic bags
 clear plastic cups
 recycled nylon stockings
 skewers
 small fabric or yarn streamers.
 plastic wrap
 tape
 glue
 spoons
 gloves
 materials for bug models
 Styrofoam
 clay or Play Dough
 straws
 egg cartons
 small boxes
 tubes
 others as requested or brought in by students
 magnifying lenses
 Student Pages K.3.9A INSECT
 K.3.9B BUGS

PRODUCTS

Expanded class chart about the way bugs walk from Activity K.3.8 HOW
 BUGS WALK
 Bug models
 Completed Student Pages

PROCEDURES**1. Introduce the use of a magnifying lens.**

Help the students do the following:

- Hold the magnifying lens close to object to be viewed.
- Slowly move the magnifying lens up toward the eye until the object comes into focus.
- Practice with various objects.
 - ✓ A center where hidden things can be looked for in sand, soil, or fish gravel is a good place to practice.

2. Prepare for the field experience.

- Make marker flags and temporary cages.
- Discuss field safety.
 - ✓ Include how animals are to be observed and handled.
 - ✓ Mention the kinds of animals to tell you about.

3. Return to the rhyme "We Are Bugs" in Activity K.3.8 HOW BUGS WALK and help the students recall how to tell whether they have found insects, spiders, crustaceans, centipedes, or millipedes.

4. Have the students take hand lenses into the field and observe bugs.

Have them do the following:

- Look for insects, spiders, centipedes, millipedes, and crustaceans such as sow bugs.
- Notice the kinds of places the bugs are found.
- Observe how each kind of bug walks.
- Return to the classroom and tell what they have found.

5. Have the students take marker flags and containers with covers and return to the field to collect insects to bring into the classroom. Have them get insects as large as possible.

Have them do the following:

- Scoop up insects carefully and gently.
 - ✓ They can usually be scooped up with the containers.
- Cover the containers for viewing.
- Put marker flags where the insects are collected.

6. Have the students observe their insects as you lead a discussion.

Ask such questions as these:

- How do you know that you have an insect?
 - ✓ Get at the number of legs.
 - ✓ Use a magnifying lens as necessary.
- Can anyone show us the head of your insect?

- How do you know it is the head?
✓ Work for the idea that this is where you find what look like eyes and antennas.
 - Can anyone show us where your chest is?
✓ Ask whether anyone knows another name for chest, one that doctors sometimes use. If needed, give them the name *thorax* and write the word on the board.
 - Insects have a thorax. Where might your insect's thorax be?
✓ Work to the idea that it is next to the head.
 - Does anyone find a bulge next to the head? Can you show us?
✓ The thorax will be quite prominent on insects such as ants or grasshoppers and less prominent on beetles.
 - Does anyone know what doctors call your "tummy" or belly?
✓ Work to the idea of an *abdomen*. Write the word on the board.
 - Does anyone find a bulge behind the thorax? Can you show us?
✓ The abdomen will be quite prominent on insects such as ants and grasshoppers and less prominent on beetles.
 - Where on your insect do the legs seem to be attached?
✓ This will be on the thorax. However, there will be a lot of movement and this may be difficult to see.
 - Does anyone see anything else on your insect?
✓ Get at such things as wings, mouth parts, and antennas.
7. **Have them draw and label a picture of their insect on Student Page K.3.9A INSECT. Have them include labels for the head, thorax, abdomen, wings (if found), antennas, eyes, and legs.**
8. **When the students have completed their observations, have them return their insects to the place they were found.**
- Collect the markers.
 - If there is time, have the students investigate other bugs the same way.

9. Have the students make three-dimensional models of a bug out of recycled materials.

Help the students do the following:

- Label the parts of their models.
- Display their model and describe how it works.

10. Summarize the activity using Student Page K.3.9B BUGS.

Ask such questions as these:

- How many external body parts do different bugs have?
 - How did each kind of bug really walk?
 - ✓ Probe to see whether their bugs walked as they predicted and add the observation to the Bug Walk Chart from Activity K.3.8 HOW BUGS WALK.
 - ✓ You may want to have the students do the bug walks again and modify their movements.
 - ✓ Keep Student Pages K.3.9A and K.3.9B for later activities.
-

EXTENSION

- Use a magnifying center to observe insects and other bugs. The center can be used anytime there are interesting things to see.



K.3.10 PARTS OF MAMMALS

OBJECTIVES

The students

- identify furry animals as mammals
- make drawings of mammals
- identify mammal external body parts and their functions
- compare the external body parts of bugs and mammals

BACKGROUND

PARTS OF MAMMALS is one of a series of activities about external anatomy. It usually follows Activities K.3.8 HOW BUGS WALK and K.3.9 PARTS OF BUGS and precedes K.3.11 PEOPLE. The class book about animals and their environments from Activity K.3.6 ANIMAL ENVIRONMENTS can be utilized effectively in this series.

Many animals have parts that are similar though they may differ in number, location, or shape. The students use their previous experience with animals in and out of school to build their understanding of mammals as nursing, furry animals. In PARTS OF MAMMALS they compare mammals with the insects they previously studied.

Precision of language

The students may include the external genitalia of mammals in their list of body parts. External genitalia and mammary or milk-producing organs are common body parts of mammals. If these parts are suggested, take the opportunity to encourage the students to use scientifically correct terms. Explain that this is the language of doctors, nurses, and scientists.

STUDENT ROLES

Zoologist
Anatomist

MATERIALS

class book about animals and their environments from Activity K.3.6
 ANIMAL ENVIRONMENTS
 Student Pages K.3.9A INSECT
 K.3.9B BUGS
 K.3.10 MAMMALS

PRODUCTS

Completed Student Pages

PROCEDURES

1. **Ask the students to name some furry animals. List them on the chalkboard or on chart paper. Use the book about animals and their environments from Activity K.3.6 ANIMAL ENVIRONMENTS as a resource. Then build the concept of a mammal.**

Ask such questions as these:

- What are some animals that have fur or hair?
 ✓ Work for the inclusion of grazing animals (sheeps, cows, and so forth) and meat-eating animals (cats, dogs, and so forth). Be sure monkeys, apes, and humans are included.
- How do furry animals raise their babies?
 ✓ Work for the observation that they care for them and nurse them or give them milk.
- Do you know a name for this group animals that nurse their babies and have hair? What is it?
 ✓ Provide the scientific name—*mammals*.
- Do you know of other animals that nurse their babies?
 ✓ Work for whales and dolphins.
 ✓ Such animals have hair or whiskers around their jaws.

2. Discuss and compare the walking of mammals and bugs.

Ask such questions as these:

- How many legs do most of the mammals listed have?
✓ The students may include whales with no legs as well as 2- and 4-legged mammals.
- How does a 4-legged mammal walk?
✓ Have the students simulate the walk of a 4-legged animal. Use one- and two-person simulations.
- Which do you think is easier to walk with—2, 4, 6, 8, or 20 legs? Why do you think this?
- Which do you think is fastest to run with—2, 4, 6, 8, Or 20 legs? Why do you think this?
✓ A cheetah can run at around 50 miles per hour, a human nearly 25 miles per hour, a skittering ant about 2 miles per hour, and a sow bug about 1/1000 mile per hour.

3. Have the students draw a 4-legged mammal. See Student Page K.3.10 MAMMALS.

4. Help the students identify body parts that mammals have in common with insects. See Student Pages K.3.9 INSECT and K.3.9B BUGS.

Ask such questions as these:

- What body parts do most mammals have?
✓ Use the class pet as an example.
✓ List the parts on the board. Include such things as mouths, noses, ears, eyes, legs, abdomens, thoraxes, and heads.
✓ If arms, fins, or wings are suggested, list them separately since only a few mammals have them.
✓ Help the students copy the words or draw pictures on the student page and check them off in the mammal column.
- What body parts do insects have?
✓ Help the students revise and complete Student Page K.3.9 INSECT.
✓ Help them copy new words or new pictures on the student page if needed.
✓ Help them check off the body parts in the insect column.
- Which body parts do most insects and most mammals have that are called by the same names?

- How do mammals use these common body parts? How do insects use them?
- Do any mammals have wings?
✓ This makes a nice Wonder and Discover Book question to be researched at home. Some students may spontaneously say "bats."

5. Discuss and compare things that mammals and insects do.

Ask such questions as these:

- Are there things that mammals and insects do that are alike?
✓ Get at similarities of body functions—they both eat, move, produce young, and so forth.
- Are there things that insects and mammals do that are not alike?
✓ Get at such things as insects lay eggs while mammals have live babies that look like their parents; mammals nurse their babies while insects don't.
✓ Some students may know of the duck-billed platypus, which is a mammal but lays eggs. It also nurses its babies.

EXTENSION

- Have the students make a three-dimensional model of a mammal from clay or recyclable items.



K.3.11 PEOPLE

OBJECTIVES

The students

- identify the external body parts of humans
- identify the functions of external human body parts
- compare the external body parts of humans with those of other animals

BACKGROUND

PEOPLE is the last of four activities about external anatomy. It usually follows Activities K.3.8 HOW BUGS WALK, K.3.9 PARTS OF BUGS, and K.3.10 PARTS OF MAMMALS.

Using other mammals as models

Because it is very difficult to observe humans the way we can other animals, we get much of our understanding of ourselves by studying other animals, particularly mammals.

Vocabulary development

By this point in the inquiry into animals the students will have a fair vocabulary to identify the different external body parts of humans. Use the Working Dictionary if students ask questions that go beyond the body parts and terminology used in the procedures. Pose questions as opportunities for research.

STUDENT ROLES

Zoologist
Anatomist

MATERIALS

drawing paper
anatomy reference books
Student Pages K.3.11A THE HUMAN BODY
K.3.11B BODY PARTS

PRODUCTS

Class chart about similar body parts
Completed Student Pages

PROCEDURES

1. **Have the students draw an outline of the human body and help them identify body parts and their functions. Have them use Student Page K.3.11A THE HUMAN BODY.**

- Draw an outline of a human torso on the board and have the students use it as a model for their own outline.
 - ✓ Don't include facial features, hands, or feet.
 - ✓ Have the students use a pencil so that they can make changes.
- Have the students identify and name various body parts.
 - ✓ Add these to your body outline and label them.
 - ✓ Have the students draw and label their own pictures.
- Have the students tell the function of each part.

2. **Have the students use Student Page K.3.11B BODY PARTS to compare the body parts of humans with other mammals and bugs. Develop a class chart of similar body parts.**

Ask such questions as these:

- What body parts do we have that are the same as those of other mammals we have studied before?
 - ✓ Get at such things as hair, heads, thoraxes, abdomens, eyes, ears, mouths, noses, and four limbs. The students may include mammary glands or milk-producing organs.
- Do we have body parts that some mammals we have studied don't have? What are they?
 - ✓ Get at such things as arms instead of the front legs of four-legged animals and the wings of bats; toes and hands instead of the hooves of cattle and horses or the paws of bears and cats and dogs; and very short tailbones instead of the long tails of monkeys, cattle, dogs, cats, and whales.

- Do other animals have body parts that we don't have? What are they?
✓ Get at such things as the hooves of cattle and horses, the paws of bears, cats, and dogs; and the wings of bats and tails of whales.
- Are there any mammals that have the same body parts that we have?
✓ Work for monkeys and apes.
- Do monkeys and apes have any body parts that we don't have?
✓ Work for the idea that monkeys have tails, then have the students feel their own tailbones.
- What body parts are the same as those of insects?
✓ Get at such things as heads, thoraxes, abdomens, eyes, mouths, and legs.
- What body parts are the same as those of other bugs?
✓ Get at such things as heads, eyes, mouths, and legs.
- Do we have body parts that bugs don't have? What are they?
✓ Get at such things as hair, ears, noses, fingers, and so forth.
- Do bugs have body parts that we don't have? What are they?
✓ Get at such things as antennas, six or more legs, shell-like bodies or exoskeletons, segmented bodies, and so forth.

3. **Discuss why we humans are classified as mammals.**

Ask such questions as these:

- Why do you think we are called mammals?
✓ Get at the idea that we have the same body parts as other mammals.
- How can knowing about other animals help us know about ourselves?
✓ Help the students speculate that if we have similar body parts, those body parts must function in about the same way. Therefore, animals can tell us about the way our body parts function.

EXTENSIONS

- Have the students make a three-dimensional model of a human out of clay or recyclables and have them label the body parts.
- Have the students make a tracing of their body and draw and label body parts. Make the outlines into a classroom display.



K.3.12 ANIMALS AND FOOD

OBJECTIVES

The students

- observe that humans eat food
- observe that non-human animals eat food
- generalize that all animals eat food
- observe that animals eat mostly living or once-living things.
- observe that some animals eat meat, some plants, and some both meat and plants.
- create working definitions of carnivores, herbivores, and omnivores

BACKGROUND

ANIMALS AND FOOD is part of the series of activities about the basic biological needs of animals. It focuses on the need for food. It usually follows Activity K.3.6 ANIMAL ENVIRONMENTS and precedes or is done along with K.3.13 ANIMALS AND WATER, K.3.14 ANIMALS AND AIR, K.3.15 ANIMAL WASTES, K.3.16 HOW ANIMALS KEEP WARM, and K.3.17 HOW ANIMALS KEEP COOL.

Food as a biological need

Animals require food. The students will, of course, know that they need food themselves and that their pets need food. ANIMALS AND FOOD introduces the idea that all animals need food.

Categorizing animals by diets

Animals can be categorized according to the foods they eat. In this activity the students categorize them as *carnivores* (meat eaters), *herbivores* (plant eaters), or *omnivores* (meat-and-plant eaters). Help the students discover that animals mostly eat living or once-living things.

STUDENT ROLE

Zoologist

MATERIALS

chart paper
felt pens
Working Dictionary
school lunch menu
class book about animals and their environments from Activity K.3.6
ANIMAL ENVIRONMENTS
Student Page K.3.12 FOODS ANIMALS EAT

PRODUCTS

Class chart about carnivores, herbivores, and omnivores
Working definitions of carnivores, herbivores, and omnivores
Completed Student Pages

PROCEDURES

1. Discuss the need of animals to eat.

Ask such questions as these:

- Do you need to eat?
- What do you eat?
- How do you feel when you don't eat?
- Do pets need to eat?
- What do pets eat?
- Do other animals need to eat?
- What do other animals eat?

2. Have the students refer to their book about animals and their environments from Activity K.3.6 ANIMAL ENVIRONMENTS. Help the students identify the eating habits of the animals. Make a class chart about animals' eating habits.

Ask such questions as these:

- Which animals don't eat?
✓ Work to the idea that all animals eat.

- Which animals mostly eat living things?
✓ This includes most herbivores and many carnivores.
- Which animals mostly eat once-living things?
- Which animals mostly eat never-living things?
✓ If it is suggested that some animals eat never-living things, work to identify the particular never-living things. Someone might mention water, salt, gravel for birds, and vitamins and minerals for humans. Follow up to see whether the animals *also* eat any once-living or living things. Verify the students' understanding of "mostly."
✓ If water is given as a never-living thing, which it is, ask what we call it when take water into our body? Work for the term "drinking" in contrast with "eating." Water will be investigated in Activity K.3.13 ANIMALS AND WATER.

3. Introduce the animal classifications of carnivore, herbivore, and omnivore.

Ask such questions as these:

- What kind of foods do tigers and lions mostly eat?
- Are there other animals that eat mostly meat?
- Do you know what these animals are called?
✓ Volunteer the term *carnivores* if necessary.
- What kind of food do cows and rabbits mostly eat?
- Are there other animals that eat mostly plants?
- Do you know what these animals are called?
✓ Volunteer the term *herbivores* if necessary.
- What kind of food do chickens eat?
- Are there animals that eat both meat and plants?
- Do you know what these animals are called?
✓ Volunteer the term *omnivores* if necessary.
- What kind of foods do our class pets eat?
- What kind of animals are they—carnivores, herbivores, or omnivores?

4. Have the students complete Student Page K.3.12 FOODS ANIMALS EAT.

- Have the students draw or paste in pictures of one or more animals they have identified as carnivorous, herbivorous, or omnivorous. Name the animals and attach the picture on the class chart.
- Be sure to include class pets.

5. Read the school lunch menu to the class to find out what people eat, then add humans to the class chart.

Ask such questions as these:

- Are there foods that come from plants on our school lunch menu? What are they?
- Are there foods that came from animals? What are they?
- What kind of animal was the lunch prepared for—a carnivore, herbivore, or omnivore?
 - ✓ Get at the idea that humans eat both foods from plants and animals; they are omnivores, and the foods on the menu are foods omnivores can eat.
 - ✓ If the topic of a vegetarian diet comes up, work to the idea that humans can choose to eat as herbivores, carnivores, or omnivores.
- Could a herbivore eat our lunch?
 - ✓ Get at the idea that a herbivore could eat the plant material.
- Could a carnivore eat our lunch?
 - ✓ Get at the idea that a carnivore could at least eat the animal material. Some dogs will eat vegetable matter, particularly if it is cooked.

6. Help the students develop working definitions for carnivores, herbivores, and omnivores and put the definitions in the Working Dictionary.

- Help them with examples including humans.
-

EXTENSIONS

- Make a class book about carnivores, herbivores, and omnivores telling what particular foods they eat most of the time.



K.3.13 ANIMALS AND WATER

OBJECTIVES

The students

- observe how much water they drink
- share the feeling of thirst
- observe that classroom animals need water
- generalize that animals need water
- practice volumetric measuring and graphing

BACKGROUND

ANIMALS AND WATER is one of a series of activities on basic biological needs. It looks at the need of animals for water. Other activities include K.3.6 ANIMAL ENVIRONMENTS, K.3.12 ANIMALS AND FOOD, K.3.14 ANIMALS AND AIR, K.3.15 ANIMAL WASTES, K.3.16 HOW ANIMALS KEEP WARM, and K.3.17 HOW ANIMALS KEEP COOL.

To get a sense of the importance of water, in ANIMALS AND WATER the students count the number of cups of water they drink from the time class begins until lunch. They then graph the class water intake and make generalizations about the water needs of animals.

Biological need for water

Students usually get thirsty more often than hungry. They satisfy their thirst with random drinking. The amount they drink depends in part on the temperature of the day and the amount of their physical activity.

Agreement on a full cup

The students should agree on how full a cup should be to be considered a "full" cup, usually to the rim or to a line near the top of the cup. Water can be measured ahead of time and left out for the students to take as they need it. Various groups can refill the cups during the course of the morning or pitchers of water can be placed on a table so that students can fill their personal cups any time they feel thirsty.

STUDENT ROLE

Biologist

MATERIALS

small plastic or paper drinking cups—medicine size
pitchers
source of drinking water
quart or liter measuring containers
chart paper
markers
Student Page K.3.13 WATER I DRINK

PRODUCTS

Class graph of the number of cups of water that were drunk
Completed Student Pages

PROCEDURES

1. **Introduce the experiment of measuring the amount of water the students drink from the time the class begins to right before lunch. Then help them carry out the experiment.**

Help the students do the following:

- Label a personal drinking cup with their name or initials.
- Agree on how much water makes a "full" cup.
- Agree on a procedure for refilling their personal cups.
- Work in teams to remind each other to drink only measured amounts of water.
- Use Student Page K.3.13 WATER I DRINK to record the number of cups of water they drink.
✓ If they start with a bottom cup and color one cup for each cup they drink, the students can then cut out the colored cups to construct the graph asked for in Procedure 2.

2. **Make a class graph showing the number of cups of water that each student drank.**

3. **Summarize the experiment.**

Ask such questions as these:

- How many cupfuls did you drink?
✓ Record the students' data on the class graph.
- Were you very thirsty when you got water?
- How does being thirsty feel?
- Who drank the most water?
- What do we mean by the most water?
✓ Get at the idea that largest amount or most water is called the *largest volume* of water.
- Who drank the least amount of water?
- What do we mean by the least amount of water?
✓ Get at the idea that the least amount of water is called *smallest volume* of water.
- Were you very thirsty by lunch time?
- Who drank about the same volume of water as someone else?
✓ Start to use the term *volume*.
- What do we mean by the same volume of water?
- Who drank a different volume from everyone else?
- What do we mean by a different volume?

4. **Have each student pour the same number of cups that they drank into liter or quart measuring containers. Record and compare the quantities that they drank.**

Ask such questions as these:

- Who drank the most water?
- Is it the same person as shown on the graph of the number of cups? Why?

- Who drank the least?
- Is it the same person as shown on the graph of the number of cups? Why?

5. Discuss the need of animals to have water.

Ask such questions as these:

- What else drinks water besides people?
- Do our class pets drink water?
- Do you think that they feel thirsty?
- Can they get water on their own?
- How does this make us responsible for them?
- Do fish need water?
- Can you think of any animals that don't need water?
✓ If exceptions are suggested, put them in the Wonder and Discover Book.
- Do all or most animals seem to need water?
- Do plants need water?
✓ Refer to Activity K.4.5 PLANTS AND WATER.

EXTENSION

- Have the students measure and compare the amounts of water the class pets drink in a day.



K.3.14 ANIMALS AND AIR

OBJECTIVES

The students

- describe what is meant by breathing
- discover what parts of the body are involved in breathing
- identify other animals that breathe in the same way humans breathe

BACKGROUND

ANIMALS AND AIR is one of a series of activities about basic biological needs. Other activities in the series are K.3.6 ANIMAL ENVIRONMENTS, K.3.12 ANIMALS AND FOOD, K.3.13 ANIMALS AND WATER, K.3.15 ANIMAL WASTES, K.3.16 HOW ANIMALS KEEP WARM, and K.3.17 HOW ANIMALS KEEP COOL.

Biological need for air

Breathing, the process of taking in oxygen and getting rid of carbon dioxide, is another essential biological process of animals. In ANIMALS AND AIR the students investigate their own breathing and the breathing of their pets. The idea of exhaled air as waste air will be undertaken in later work.

Breathing in animals

Land animals such as amphibians, reptiles, birds, and mammals use lungs to breathe. Bugs or arthropods breathe using a system of air tubes running through their bodies. Fish and many invertebrates breathe using gills. Worms breathe through their skin or outer body membranes. The students make their first generalizations about breathing from limited data. The initial generalizations will be validated over time as the students acquire more data.

STUDENT ROLES

Biologist
Zoologist

MATERIALS

pencils
 class pets
 stethoscope, optional
 Working Dictionary
 Student Page K.3.14 BREATHING

PRODUCTS

Completed Student Pages

PROCEDURES

1. **Begin with some physical exercise such as running or doing jumping jacks so that the students are breathing hard.**

Ask such questions as these:

- What do you do when you breathe?
- Can you feel what you are doing?
- Can you show the class so that they can see or feel what you mean by breathing?

2. **Have the students put their hands lightly over their mouths and breathe through their mouths.**

Ask such questions as these:

- Do you feel something going through your hands?
- What do you think it is?
- Do you feel air coming out of your mouth?
- Can anyone give the a name for what you are doing?
 ✓ Introduce the term *exhaling* and write it on the board.
- Do you feel air going into your mouth?
- Can anyone give us a name for what you are doing when air comes out of your mouth?
 ✓ Introduce the term *inhaling* and write it on the board.

- What are inhaling and exhaling called when they work together?
✓ Introduce the term *breathing* if necessary and write it on the board.
- Can you breathe any other way than through your mouth?
✓ Ask a few students to demonstrate that they can breathe just as well through their nose as their mouths unless they have a cold.

3. Have the students breathe deeply through their nose outdoors in cold air if possible or in a deep freezer or over ice in an ice chest.

Ask such questions as these:

- What do you see coming out of your nose on a cold day?
- Where does the air seem to go when you inhale?
✓ Have the students breathe deeply so that they can feel the air entering their throat and chest.
- What is this part of your body called?
✓ Point to the chest and use the terms *thorax* and *chest*. Write these words on the board. Refer to Activities K.3.8 HOW BUGS WALK, K.3.9 PARTS OF BUGS, and K.3.10 PARTS OF MAMMALS.

4. Have the students draw their concept of the body parts the air goes through in reaching the chest. Have them show the head, nose and mouth, neck and chest. Have them use Student Page K.3.14 BREATHING.

- Draw an outline of the head neck and chest next to the words already on the board or chart paper. See Fig. K.3.14.
- Help the students draw their own body shape and put in the body parts they felt in breathing.
- Help the students label their diagrams.
- Have the students share their pictures and tell about them.
✓ Work for general agreement about the way the air seemed to move.
✓ If there is confusion, use Fig. K.3.14 or draw your version to show how you think the air moved.
- Have the students label their diagrams.

- 5. Have the students stand up and hold their breath for as long as they can. Time the students and have them sit down when they take a breath.**

Ask such questions as these:

- What did it feel like when you were near the end of holding your breath?
- What did it feel like when you finally took a breath?
- What might happen to you if you could not breathe?
✓ Work to the idea that you could not live. To save us someone would have to give us artificial respiration or put us on a respirator.

- 6. Have the students observe class pets to see whether they breathe.**

Ask such questions as these:

- Do you know of other animals that breathe? What are they?
- How can you tell whether a class pet is breathing?
- Do you think other animals need to breathe?
- Why do you think nylon hose or plastic with holes were used to cover insect collection containers?
- What can you say about breathing in our Working Dictionary?
✓ Help the students develop a working definition using the terms *inhaling* and *exhaling*.

EXTENSIONS

- Have the students observe other animals and report on their breathing.
- Use a stethoscope to listen to the students' and other mammals' breathing.

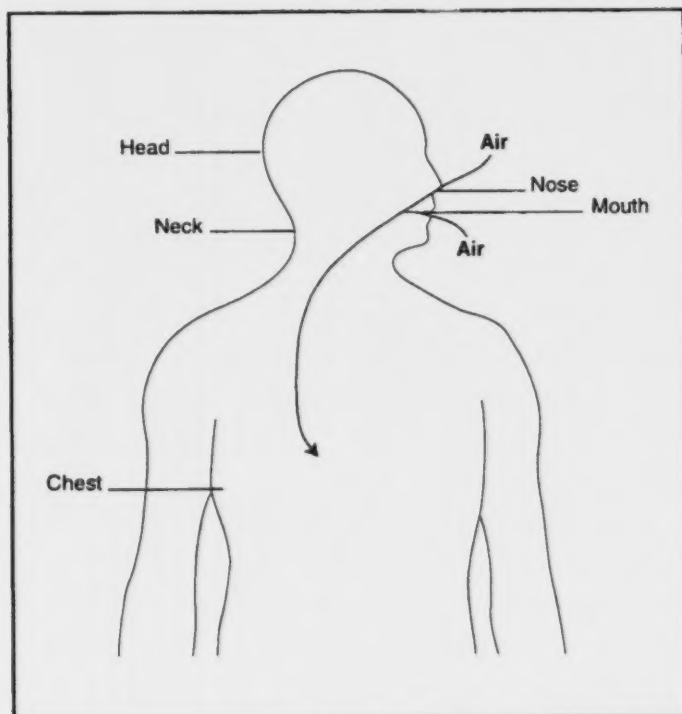


Fig. K.3.14 Air passage into the body



K.3.15 ANIMAL WASTES

OBJECTIVES

The students

- observe that animals produce solid, liquid, and gaseous wastes
- identify sites of elimination in animals
- establish that humans also eliminate wastes
- use the vocabulary of elimination

BACKGROUND

ANIMAL WASTES is part of the series of activities about basic biological needs, and it looks at animals' need to eliminate waste. It usually is preceded by Activities K.6.8 APRONS, K.6.5 GERMS, and K.6.6 WASHING HANDS. It is usually done along with or shortly after starting K.3.3 CARING FOR CLASSROOM ANIMALS. Other activities in the biological needs series are K.3.6 ANIMAL ENVIRONMENTS, K.3.12 ANIMALS AND FOOD, K.3.13 ANIMALS AND WATER, K.3.14 ANIMALS AND AIR, K.3.16 HOW ANIMALS KEEP WARM, and K.3.17 HOW ANIMALS KEEP COOL.

Suggested context of use

It is suggested that elimination of waste be discussed in the context of cleaning the classroom pet cages. Having both male and female pets available will enhance the activity. This discussion should probably be broken up into several sessions so that too much new vocabulary is not introduced at one time. The kind of interaction suggested here allows discussion of terms to be done in the unstructured setting of cage cleaning. The focus is on the anatomy and biological processes of pets.

Human anatomy and functions

Discussion of human elimination, body parts, and functions need not be undertaken at this point; thus Procedures 3, 5, and 7 dealing with human systems need not be included. However, the language used will also apply to humans.

Language

The term *elimination* is used to describe the ridding of the body of gaseous, liquid, and solid waste in the process of *passing gas*, *urination* and *defecation*. Other terms may be substituted—*stool* or *feces* for solid waste, *bowel movement* for defecation, and so forth. Three categories of terms are needed: those identifying the process, product, and site of exit.

Table 5.3.15 Elimination terminology

Process	Product	Exit
Passing gas	Gaseous waste Gas Flatus	Anus
Defecation/defecate bowel movement/ move the bowels	Solid waste Feces Stool	Anus
Urination/urinate	Liquid waste Urine	Vulva (female) Penis (male)

Parental concerns

The teacher should be sensitive to parental concern. Parents should be alerted that scientific language will be used to describe elimination and body parts. This can be done at open house and through direct communications with the home. It is equally important that the principal know that technical scientific language is being used in the classroom.

Early introduction of terms

There is a major advantage to early introduction of the vocabulary of elimination—kindergartners are not as self-conscious about their bodies as they will be in later years. This is a time when students can readily acquire the technical scientific language needed for later study of reproduction and disease.

STUDENT ROLES

Anatomist
Zoologist

MATERIALS

washable or disposable gloves
aprons from Activity K.6.8 APRONS
classroom animals and cages

PRODUCT

Vocabulary of the elimination process

PROCEDURES

1. **Discuss the process of elimination with the students while the animal cages are being cleaned.**

Ask such questions as these:

- Why do you need to clean the cage?
- What are you taking out of the cage?
 - ✓ Get at the idea of animal wastes.
 - ✓ Point out that we call them *feces* and *urine*.
- Why do you wear an apron when you clean cages?
 - ✓ Get at the idea of keeping clothes clean.
- Why do you wash your an apron after you have cleaned a cage?
 - ✓ Get at the idea of removing any waste that might get on aprons.
- Why do you wear plastic gloves?
 - ✓ Get at the idea of keeping hands clean.
- Why do you wash your hands even though they have been covered by gloves?
 - ✓ Get at the idea that even though you have covered your hands, there still may be waste on them.

2. When the students clean the cages, discuss solid waste using the terms feces, anus, and defecation or other.

Ask such questions as these:

- What do you mean when you say something is solid?
✓ Get at the idea that solid things hold their shape.
- What are some examples of solids?
- What is meant by solid waste?
- What is the solid waste called?
✓ Accept all answers and introduce the scientific word for solid waste, *feces*.
- Can you point to the animal's feces on the paper?
✓ Point to it.
- Has anyone observed where the feces leave the animal's body?
Where?
- What is this opening called?
✓ Accept all answers and introduce the scientific name, *anus*.
- What do you call the passing of solid waste or feces from the animal?
✓ Accept common terms and introduce the scientific term, *defecation*.

3. Discuss the human defecation process.

Include the following:

- Both pets and humans produce feces.
- The feces of both pets and humans leave the body through the anus.
- Going to the toilet and producing feces is called *defecation* or *moving the bowels*.

4. Discuss liquid waste, introducing the terms urination, urine, penis, and vulva.

Ask such questions as these:

- What is meant by liquid waste?
✓ Get at the idea that *liquid waste* is the water-like waste from the pet's body.

- What do you mean by liquid?
✓ Get at the idea that a *liquid* is anything that acts like water.
- What are some examples of liquids?
- Does anyone know what this liquid waste from animals is called?
✓ Accept all answers and introduce the scientific term for liquid waste, *urine*.
- Can anyone show us the animal's urine on the paper?
- Has anyone observed where the urine leaves the animal's body? Where?
✓ This will usually generate two answers—one for male animals, one for female.
- Does anyone know what this body part is called?
✓ Accept all answers and introduce the scientific name *penis* for male animals and *vulva* for female animals.
- What do you call the passing of liquid waste or urine from the animal?
✓ Accept common names and then introduce the scientific term, *urination*.

5. Discuss the human urination process.

Include the following:

- Humans produce urine.
- Going to the toilet to produce liquid waste is called *urination*.
- Urine leaves our bodies through the vulva or penis.

6. Discuss gaseous waste, introducing the term gas and reviewing the term anus.

Ask such questions as these:

- What do you mean by a gas?
✓ Get at the idea that a *gas* is anything that acts like air.
- What are some examples of gases?
✓ Get at such examples as the gas in the pipes in the house, the steam from a teakettle, and the air we breathe.

- Does anyone know what the gaseous waste from an animal is called?
✓ Accept all answers and introduce the scientific terms for gaseous waste, *gas* or *flatus*.
- Has anyone observed where the gas leaves the animal's body? Where?
- What do you call this part of the body?
✓ Work for *anus*.
- What do you call the passing of gas from the animal?
✓ Accept common names and then introduce the scientific term, *passing gas*.

7. Discuss the human gas-passing process.

Include the following similarities between pets and humans.

- Both produce gas.
- Both pass gas throughout the day.
- Both pass gas through the anus.

8. Observe other animals to determine whether they produce body wastes as discussed.

Ask such questions as these:

- Do you know of other animals that produce body wastes?
- Do you think all animals produce body waste? Why?

EXTENSIONS

- Have the students discuss what they think is the source of the body waste in animals (a great Wonder and Discover Book entry).
- See the *DASH Book List* for suggested readings.



K.3.16 HOW ANIMALS KEEP WARM

OBJECTIVES

The students

- observe how pet animals keep warm in winter
- research how other animals keep warm

BACKGROUND

HOW ANIMALS KEEP WARM is part of a series of activities about basic biological needs. Other activities in the series are K.3.6 ANIMAL ENVIRONMENTS, K.3.12 ANIMALS AND FOOD, K.3.13 ANIMALS AND WATER, K.3.14 ANIMALS AND AIR, K.3.15 ANIMAL WASTES, and K.3.17 HOW ANIMALS KEEP COOL. HOW ANIMALS KEEP WARM parallels the study of how people keep warm in Activity K.6.18 KEEPING WARM INDOORS.

Challenge of cold weather

Cold weather presents a challenge to all animals, including humans. Different kinds of animals respond differently to the challenge. In HOW ANIMALS KEEP WARM, the students begin their observation of animals in the wintertime.

Finding answers

Don't try to get a full answer to the question of how animals keep warm. Leave this to the students to get on their own from parents, siblings, TV, and so forth. Identify an "animal of the week" and record information about it regularly.

STUDENT ROLES

Zoologist
Animal behaviorist
Naturalist
Researcher

MATERIALS

chart paper

markers

book about animals and their environments from Activity K.3.6 ANIMAL ENVIRONMENTS.

Student Page K.3.16 ANIMALS AND COLD WEATHER

PRODUCTS

Charts about how animals keep warm

Expanded book about animals and their environments from Activity K.3.06 ANIMAL ENVIRONMENTS

Completed Student Pages

PROCEDURES

1. **On a morning that is quite chilly, wonder aloud how animals keep warm. Make a list of students' responses to the following kinds of questions, but don't press for a final answer.**

Ask such things as these:

- How do you think dogs keep warm in winter?
- Has anyone noticed anything different about dogs when winter is coming?
- How do you suppose sheep keep warm in winter?
- Does anyone know what happens to sheep during the summer that gets them ready for winter weather?
- How do you suppose squirrels keep warm in winter?
- How do you suppose birds keep warm in winter?
- How do you suppose bears keep warm in winter?
- How do you suppose insects keep warm in winter?
- How do you keep warm in winter?

2. **Identify an animal each week and have the students investigate how it keeps warm. Student Page K.3.16 ANIMALS AND COLD WEATHER can be used by the students to record what they find.**

Help the students include the following:

- The animal's environment.
 - ✓ Refer to the class book about animals and their environments from Activity K.3.6 ANIMAL ENVIRONMENTS.
- How the animal keeps warm when its cold.
 - ✓ This a good time for parents to help.
- Other interesting things about this animal.

3. **Have the students report each week and record the information on a poster or chart about the animal of the week.**

Ask such questions as these:

- Are there other animals that keep warm the same way?
- Do these other animals that keep warm the same way live in the same kind of place?
- Do these animals seem to like cold weather?

EXTENSIONS

- Help the students make a list of the ways that humans keep warm.
- Help the students compile a second volume of the book about animals and their environments focused on how animals keep warm.



K.3.17 HOW ANIMALS KEEP COOL

OBJECTIVES

The students

- observe how animals stay cool in summer
- research how animals stay cool

BACKGROUND

HOW ANIMALS KEEP COOL is part of the series about basic biological needs. Other activities in the series are K.3.6 ANIMAL ENVIRONMENTS, K.3.12 ANIMALS AND FOOD, K.3.13 ANIMALS AND WATER, K.3.14 ANIMALS AND AIR, K.3.15 ANIMAL WASTES, and K.3.16 HOW ANIMALS KEEP WARM. HOW ANIMALS KEEP COOL parallels study of how people keep cool in Activity K.6.19 KEEPING COOL INDOORS.

Challenge of warm weather

Hot weather, like cold weather, presents a challenge to most animals, including humans. Different animals respond differently to the challenge of keeping cool. HOW ANIMALS KEEP COOL is a companion to K.3.16 HOW ANIMALS KEEP WARM.

Finding answers

Don't try to get a full answer to the question of how animals stay cool. Leave this to the students to research on their own from parents, siblings, TV, and so forth. Continue the work with the animal of the week and record the information as before.

STUDENT ROLES

Zoologist
Animal behaviorist
Naturalist
Researcher

MATERIALS

chart paper
markers

class book about animals and their environments from Activity K.3.6
ANIMAL ENVIRONMENTS.

Student Page K.3.17 ANIMALS AND WARM WEATHER

PRODUCTS

Charts about the animals of the week

Expanded class book about animals and their environments from
Activity K.3.6 ANIMAL ENVIRONMENTS

Class chart about how animals keep cool

Completed Student Pages

PROCEDURES

1. **On a morning that is quite warm, wonder aloud how animals stay cool. Make a list of the students' responses to the following kinds of questions, but don't press for a final answer.**

Ask such questions as these:

- How do you think dogs stay cool in summer?
- Has anyone noticed anything different about dogs now that summer is coming?
- How do you suppose sheep stay cool in summer?
- Does anyone know what happens to sheep during the spring that gets them ready for summer weather?
- How do you suppose squirrels stay cool in summer?
- How do you suppose birds stay cool in summer?
- How do you suppose bears stay cool in summer?
- How do you suppose insects stay cool in summer?
- How do you stay cool in summer?

2. **Continue to identify an animal each week to learn about. Student Page K.3.17 ANIMALS AND WARM WEATHER can be used by the students to record what they find.**

Have the students include the following:

- The animal's environment.
✓ To start, use the information in the class book about animals and their environments from Activity K.3.06 ANIMAL ENVIRONMENTS.
- Where the animals lives when it is hot.
✓ This a good time for parents to help.
- How the animal stays cool when it is hot.
- Other interesting information about the animal.

3. **Have the students report each week and post the information on a class chart or poster about each animal.**

Ask such questions as these:

- Are there other animals that stay cool the same way?
- Do these other animals that stay cool the same way live in the same kind of place?
- Do these animals seem to like warm weather?
- How do the ways these animals keep cool compare with the ways they keep warm?

EXTENSIONS

- Have the students report on how they keep cool.
- Have the students add pictures, posters, and other information to their book about animals and environments.



K.3.18 REAL OR IMAGINARY?

OBJECTIVES

The students

- establish that real animals can be touched, seen, heard, and smelled and that they eat, defecate, urinate, and move about
- create imaginary animals in their minds
- assess the likelihood that their imaginary animals could live

BACKGROUND

REAL OR IMAGINARY? explores the ever more difficult task of separating real things from not-real things. Here the students work at the problem of separating fantasy from reality.

World of imaginary animals

The animal cluster has been chosen to explore the concepts of reality and imagination because there are numerous examples of real and imaginary animals in the lives of the students. This activity can be done anytime during the school year.

STUDENT ROLES

Artist
Philosopher
Model maker

MATERIALS

an animal puppet
caged classroom animal
pencils, markers, crayons

PRODUCTS

Completed Student Pages

PROCEDURES

1. **Talk about real and imaginary animals using a class pet and an animal puppet. Use the puppet to talk with the students.**

Real or Imaginary Suggested Scenario

Puppet

- Today we are going to think about real animals and imaginary animals.
- Who is a real animal, our caged friend here—our class pet—or me?
- Before you answer, I want you to listen.
- You are an animal. You are a real human animal, and I'm an animal, too.
- I'm a real (cat, dog, chicken, or whatever animal the puppet is) because I can talk just like you. Our caged friend here can't talk.

I'm real because I can pick up a handkerchief and blow my nose just like you. This caged friend can't blow its nose.

- I can cry (boo, hoo, hoo, hoo), laugh (ha, ha, ha), and I can even wave good-bye. So, which one of us is a real animal, our caged friend or me, your talking friend?

2. **Discuss what makes an animal real. The discussion can be done using the puppet or you can lead it yourself.**

Ask such questions as the following:

- Is our caged friend real? How do you know?
✓ Get at the idea that we can touch and see the caged animal.
- Is the puppet real?
✓ Get at the idea that we can touch and see the puppet.
- Do real rabbits, dogs, chickens, or whatever animal the puppet is talk, use a handkerchief, cry, or laugh?

- What animal can do all the things the puppet did?
✓ Work for the idea that only a human can do the things the puppet did. It took a human to operate the puppet.
- Who is the real animal?
✓ Work to the consensus that our caged animal is a "real animal" and the puppet is a "real puppet."

3. Play an imagination game 1 using the animal puppet.

**IMAGINATION
GAME 1**

PART 1

Puppet:

- OK, so I'm a real puppet, not an animal. Let's play an imagination game.
- I want you to think of about three special animals.
- The first animal is a rabbit.
- Close your eyes. Picture its big ears, its pink nose, its wiggly whiskers, and its soft, silky fur.
- Raise your hand if you can see the rabbit in your head.
- Can you draw a picture of the rabbit you see in your head?
✓ Pass out supplies and have the students draw their rabbit. See Student Page K.3.18 REAL AND IMAGINARY.

PART 2

Puppet:

- The second animal is a goldfish. Close your eyes again. This time I want you to picture a big fish with its large mouth, round eyes, a big wavy tail, and a long, golden, scaly body.
- Raise your hand if you can see a picture of the fish in your head.
- Can you draw a picture of your fish?
✓ Have the students draw their fish. See Student Page K.3.18 REAL AND IMAGINARY.

PART 3**Puppet:**

- The third animal is a "rabbit-fish."
- Close your eyes. This time I want you to picture an animal that has the head of your rabbit and the body of your fish.
- Raise your hand if you can see a picture of this animal in your head.
- Can you make a clay model or draw a picture of this animal?
 ✓ Have the students make or draw their rabbit-fish. See Student Page K.3.18 REAL AND IMAGINARY.

4. Have the puppet lead a discussion about real rabbits and cartoon rabbits.

Ask such questions as these:

- Did you imagine a real rabbit or a cartoon rabbit in the game?
- What is the difference between a real rabbit and a cartoon rabbit?
- Did you imagine a real fish or a cartoon fish?
- Did you draw a picture of your rabbit? Your fish?
- Did you draw a picture of your rabbit-fish?
- Do you think you can find a real living rabbit-fish?
- Could your rabbit-fish be a real living thing. Why?
 ✓ Work toward the idea that there are things that don't go together such as hair and scales, a rabbit head for breathing air and a fish body for living in water.

5. Have the puppet lead another imagining experience.

**IMAGINATION
GAME 2**

Puppet:

- Think of a piece of paper.
- Think of how you could fold that paper to make it look like a wall and a floor.
 - ✓ Pass out supplies and have the students do the folding.
- Think about how you could fold the paper to make a floor and two walls.
- Now fold your paper so that it looks like the picture you have in your head.
- Were you able to imagine what the paper would look like before you folded it?
- Were you able to make something real out of paper using your imagination?
- How is the folded paper different from the rabbit-fish you made?
 - ✓ Work toward the idea that you can usually imagine not-living things that you can make.
 - ✓ But, though you can imagine them, scientists haven't yet learned how to make living animals from pieces the way we can put together a bike from pieces.
 - ✓ Point out that scientists, engineers, and everyone else imagine things before they make them.
- When is something imaginary?
 - ✓ Get at the idea of something that can exist only in someone's thinking or imagination.

EXTENSION

- Help the students analyze stories to determine whether the characters and events are real or imaginary.



PETS
SP K.3.1

Name _____

Date _____

Draw some animals that make good

School Pets

Home Pets

Draw some animals that do not make good pets.

**CLASS PET**
SP K.3.2

Name _____

Date _____

Our class pet's name is _____.

It is a _____.

This is a picture of our pet.

These are some things our pet needs.



**CARING FOR
OUR PET
SP K.3.3**

Name _____

Date _____

Draw pictures that show what you do to care
for our classroom pet.



**LIVING AND
NOT-LIVING
SP K.3.4**

Name _____

Date _____

Draw or cut out pictures of things.
Put them under the right category.

LIVING THINGS	NOT-LIVING THINGS
	ONCE-LIVING THINGS



**PLANTS AND
ANIMALS**
SP K.3.5

Name _____

Date _____

Draw or cut out pictures of plants and animals.
Put them in the right category.

PLANTS

ANIMALS



**ANIMAL
ENVIRONMENTS
SP K.3.6**

Name _____

Date _____

Draw or paste in pictures of animals and the
the environment in which they live.

The environment is _____



**ANIMALS THAT
HELP US
SP K.3.7**

Name _____

Date _____

Draw or paste in pictures showing ways that animals help us.



INSECT
SP K.3.9A

Name _____

Date _____

Draw your insect. Label the head, thorax, abdomen, leg, eye, wing, and antennae.



BUGS
SP K.3.9B

Name _____

Date _____

PICTURES	HOW MANY?				
	LEGS	CENTRAL BODY PARTS	EYES	ANTENNAS	WINGS
INSECT					
SPIDER					
CRUSTACEAN					
CENTIPEDE					

**MAMMALS**
SP K.3.10

Name _____

Date _____

Draw a 4-legged mammal and show its
body parts.



THE HUMAN BODY
SP K.3.11A

Name _____

Date _____

Draw the human body and label the parts.



**PEOPLE AND
OTHER ANIMALS
SP K.3.11B**

Name _____

Date _____

PICTURES	HOW MANY?				
	LEGS	ARMS	WINGS	HANDS	EYES
PEOPLE					
PET MAMMALS					
BIRDS					
TURTLES					
FISH					
INSECTS					
SPIDERS					



**FOODS
ANIMALS EAT
SPK.3.12**

Name _____

Date _____

Draw or paste in pictures of animals that are

Herbivores

Omnivores

Carnivores

**WATER I DRINK**
SP K.3.13

Name _____

Date _____

Color one cup every time you drink a cup of water.



**BREATHING**
SP K.3.14

Name _____

Date _____

Draw a picture that shows the way you think air goes into your body when you breathe. Show your head, mouth, nose, throat, and chest.



**ANIMALS AND
COLD WEATHER
SP K.3.16**

Name _____

Date _____

This week's animal is the _____.

Draw or paste in pictures that tell us

What it looks like

Where it lives in winter

How it keeps warm in winter



**ANIMALS AND
WARM WEATHER
SP K.3.17**

Name _____

Date _____

This week's animal is the _____ .

Draw or paste in pictures that tell us

What it looks like

Where it lives in summer

How it keeps cool in summer



**REAL AND
IMAGINARY
SP K.3.18**

Name _____

Date _____

Draw a RABBIT.

Draw a FISH.

Draw a RABBIT-FISH.



**KINDERGARTEN
CLUSTER 4**

Plants

- K.4.1 Plant Parts
- K.4.2 Plant Environments
- K.4.3 Plant Uses
- K.4.4 Growing Bean Sprouts
- K.4.5 Plants and Water
- K.4.6 Gardening



K.4.1 PLANT PARTS

OBJECTIVES

The students

- make a concept map about plants
- identify parts of plants
- use a mnemonic to learn plant parts
- observe that not all plants have the same parts
- construct a generalized plant model
- make a plant press and preserve their plant models

BACKGROUND

PLANT PARTS is the beginning study of plants. It is usually done after Activity K.3.5 ANIMALS AND PLANTS and before Activities K.4.2 PLANT ENVIRONMENTS, K.4.3 PLANT USES, K.4.4 GROWING BEAN SPROUTS, K.4.5 PLANTS AND WATER, and K.4.6 GARDENING.

In PLANT PARTS the students create a pictorial concept map of what they already know about plants. They then collect plants and identify and press samples of the plant parts.

Concept maps

If the students have done several concept maps earlier, this may be the opportune time to introduce subcategories. Don't expect the subcategories listed below to emerge in the first mapping of the concept plant. Certainly the language used here to describe subcategories will probably not be the language offered by the students. However, as the map is returned to during other studies of plants in Activities K.4.2-6, many of the ideas will be raised and the subcategories will be helpful in concept organization.

Some categories and subcategories that may be developed in making a concept map of plants are found in Table K.4.1. Keep in mind that producing a map of this scope will take regular revisiting.

Table K.4.1-1 Categories and subcategories for a concept map about plants

Category	Subcategories
• kinds of plants	<i>plant groups</i> such as trees, shrubs, grasses, vegetables, flowers, and so forth and plant names.
• places where plants are found	<i>wild places</i> such as forests and jungles and <i>planted places</i> such as farms and gardens
• parts of plants,	<i>names of parts</i> and <i>what parts do</i>
• uses of plants,	<i>kinds of uses</i> and <i>users</i>
• needs of plants	<i>kinds of needs</i> such as needs for water, light, fertilizer, and soil and <i>how needs are satisfied</i> such as by rain, watering, growing in the light, and using compost

After categories and subcategories have been identified, the students can draw or cut out pictures from magazines and other sources to tell the story of their growing understanding.

Connections

Lines can be drawn between the pictures or words as the students identify relationships. For example, if the forest is a place where plants are found, connecting arrows might be drawn to trees and mosses. From trees, arrows could go to names (pine and maple) and to uses such as building and fuel. New information should be added to the original concept map as the students learn more about plants.

Getting plants

In PLANT PARTS the students dig up plants with their roots and bring them into the classroom. Check with the school grounds crew for good digging sites. Weeds are an excellent source of plant parts. Potted plants can also be used.

Generalized plant

The students identify the parts of a plant and construct a generalized or model plant by taping parts from various plants to their student page or a piece of white construction paper. Separate parts make identification clearer and more certain. The students then preserve their model plant in a plant press. The sheets of paper with preserved plant pressings are formally called *herbarium sheets*.

Plant press

To make a plant press, place the pages with attached plant parts between sheets of newspaper. The newspaper absorbs water. Make a stack of the covered pages and place a clipboard or other hard surface on top of the stack. Finally, put a heavy weight such as a concrete block on top of the hard surface. Allow the stack to stand for a week or so. At the end of this time remove the dry pressed sheets. Use drops of glue to hold any loose plant parts on the herbarium sheets.

Herbarium sheets can be covered with plastic wrap. They can also be laminated or covered with clear contact paper. The covering will keep the dried plants from breaking apart in a notebook.

STUDENT ROLES

Botanist
Biologist

MATERIALS

hand trowels or old table knives
spoons
hand lenses
cement block
clipboard or flat piece of wood (about 12 in. x 18 in.)
newspapers
white construction paper
plants
tape
glue
plastic wrap, clear contact paper (optional)
plastic bags
Student Page K.4.1 PLANT PARTS

PRODUCTS

Additions to the class concept map about plants
Pressed plant parts
Completed Student Pages

PROCEDURES

1. Help the students make a class concept map about plants.

Organize using such questions as these:

- Do we have any plants in school? Where?
✓ Start to develop a category headed *places where plants grow*.
- Do you have any plants at home?
- Where else do plants grow?
- What kinds are they?
✓ Develop a category headed *kinds of plants*.
- What kinds of things do plants need to grow?
✓ Develop a category headed *needs of plants*.
- How do we use plants?
✓ Develop a category headed *uses of plants*.
- What are some plant parts? What parts do plants have?
✓ Develop a category headed *parts of plants*.

2. Have the students sing the *Plant Song*.

PLANT SONG

Sung to the tune of *I'm A Little Teapot*

I'm a little plant, just like them.
Here are my roots.
Here is my stem.
This is my flower.
These are my leaves.
Give me some water and some sunshine, please.

3. Help the students collect plants to study.

Before going outdoors, discuss the following:

- Which plants they may dig up.
- How to collect the entire plant, including roots.
- How to wrap the plant in paper or put it in a plastic bag to bring it into the classroom.

4. Help the students investigate roots. Give them hand lenses and review their use.

Ask such questions as these:

- Does your plant have soil on it?
- Which parts of the plants were in the ground?
- What color are these parts?

5. Help the students investigate the leaves.

- Does your plant have leaves?
- What do the leaves look like?
- What colors are the leaves?
- What are the leaves connected to?

6. Help the students investigate stems.

Ask such questions as these:

- Is there anything between the leaves and the roots on your plant?
- Can anyone tell us what this part is called?
✓ If need be, provide the name *stem*.
- Do all the plants seem to have stems?
✓ Grasses seem to have no stems or very short stems supporting their leaves, but they do have long stems supporting their seeds.
- What colors are stems?

7. Help the students investigate flowers.

Ask such questions as these:

- Does your plant have flowers?
- How do we know when we have a flower?
- What color are flowers?
- What part of the plant are flowers connected to?

8. Help the students look for seeds and other plant parts.

Ask such questions as these:

- Does your plant have seeds?
- Where did you find them?
- How do we know when we have a seed?
- What colors are seeds?
- Do plants have other parts?
- Can you tell us what the parts are?
 - ✓ This gives the students a chance to add trunks, branches, nuts, thorns, and so forth.

9. Help the students construct model plants by taping plant parts to Student Page K.4.1 PLANT PARTS.

Help them do the following:

- Tape down the plant parts.
- Label their plant parts.
 - ✓ Post a list of parts for them to copy.
 - ✓ Include roots, stems, leaves, flowers, seeds, buds, and so forth as needed.

10. Help the students make a plant press and press the herbarium pages.

- On the floor or a table top, stack the pages between sheets of newspaper.
 - ✓ Newspaper absorbs moisture coming from the plant material. Usually one full sheet (four layers of folded newspaper) is adequate for each herbarium page.
- Place a clipboard or other flat board on top of the stack.
- Weight the stack with a cement block or other heavy object.
- When the plants are dry, remove the newspapers. Pressing will take a week or more to ensure that the models are dry.
- Reattach the parts as necessary.
 - ✓ A drop of glue will work well.

- Label the plant parts.
 - Laminate the pages or cover them with clear plastic wrap or clear contact paper.
 - ✓ Plant parts on the pages can be covered with plastic before or after pressing for more permanent storage.
 - ✓ They will dry better uncovered.
-

EXTENSIONS

- Help the students make a bulletin board display about the parts of plants.
- Help the students make a totally edible plant from plant parts that they regularly eat.
 - ✓ The plant might include such things as a carrot root, a celery stem, spinach leaves, broccoli flowers, and peanuts as seeds. The parts should be taped or glued together.



K.4.2 PLANT ENVIRONMENTS

OBJECTIVES

The students

- identify the kinds of plants that grow in different environments
- make a plant press and produce herbarium sheets with their preserved plants
- make a class book about where plants grow

BACKGROUND

PLANT ENVIRONMENTS is part of the series about plants. Other activities in the series are K.4.1 PLANT PARTS, K.4.3 PLANT USES, K.4.4 GROWING BEAN SPROUTS, K.4.5 PLANTS AND WATER, and K.4.6 GARDENING.

In PLANT ENVIRONMENTS the students collect plants, noting whether they are cultivated or wild and whether they are found in places that are mostly shady or mostly sunny. They then press the plants and make a class book about where plants grow.

Long-term study

PLANT ENVIRONMENTS starts a multiyear investigation to find out what kinds of plants are associated with different environments.

Botanical names

Mastering botanical names is not a DASH goal, but if the names are known, they can be fun to use. Descriptive names are sufficient for kindergarten students. For example, an unknown plant might be called the plant with a "white trumpet flower" and another "the shrub with thorns and a large red flower."

Collecting plants

Collections of plants are aesthetically pleasing and botanically informative. If the school has flowering plants, start with these. The administration and grounds crew should be consulted before collecting.

If there are no plants on the school grounds, the students can bring plants from home or this activity can be saved for a field trip. Plant samples can be carried in a book between pieces of paper towel or in resealable plastic bags.

Environments

Collect plants from the following four environments—*wild and shady*, *planted and shady*, *wild and sunny*, and *planted and sunny*. *Sunny environments* are those that are in the sun most or all of the daylight hours. *Shady environments* are those that are in the shade most or all of the daylight hours. The students will come back to these environments throughout DASH.

Table K.4.2 Plant Environments

	Wild	Planted
Shady	Plants growing naturally beneath the tree canopies of jungles and forests or in the shade of mountains and buildings	Plants that have been planted beneath a canopy of trees, in the shade of greenhouses and buildings, or in shaded gardens
Sunny	Trees and shrubs growing naturally in meadows and on plains, prairies, deserts, and tundras	Planted trees, shrubs, lawns, fields, pastures, farm crops, and gardens

STUDENT ROLES

Botanist
Ecologist
Environmentalist

MATERIALS

plant press (See Activity K.4.1 PLANT PARTS)
 plant clippers or heavy scissors
 resealable plastic bags
 newspaper
 white paper
 chart paper
 markers
 glue
 plastic wrap
 cement block
 clipboard
 Student Page K.4.2 PLANTS AND ENVIRONMENTS

PRODUCTS

Additions to the concept map about plants
 Class book about where plants grow
 Completed Student Pages

PROCEDURES

- 1. Prepare the students for plant collecting to make a book about where plants grow.**

Discuss the following:

- Making a book about where different plants grow.
- The kinds of places where plants might grow.
 - ✓ Review the concept map about plants for insights.
 - ✓ The places might be planted or a wild.
 - ✓ The places might be sunny or shady.
 - ✓ The places might be wet or dry.
 - ✓ The places might be hot or cold.
- How to collect samples of plants that grow in different kinds of places.
- What parts to include for their plant samples.
 - ✓ Samples should include at least two or three leaves attached to a stem.
 - ✓ If possible, have the students include a flower and any seeds they find on the plant.

- Equipment they will need to collect their plant samples.
✓ Get at such things as scissors to cut stems and paper or reusable plastic bags to carry their plant samples.
- 2. **Help the students collect some wild plants and some that have been planted in sunny and shady places.**
- 3. **Have the students sort the plants into those that were planted and those that grew wild.**

Ask such questions as these:

- In what kinds of places do people grow plants?
✓ Work for such places as gardens, fields, greenhouses, window boxes, and so forth.
- Did anyone find plants in places where people planted them? Which plants were they?
✓ Group these plants and identify them so the students can retrieve their own samples for pressing.
- In what kinds of places do plants grow wild?
✓ Work for such places as forests, meadows, outside of planted places, cracks in the sidewalk.
- Did anyone find plants in places where they grew wild? Which plants were they?
✓ Group these plants and identify them so the students can retrieve their own samples for pressing.
- 4. **Ask the students to name some places where it is mostly sunny and where it is mostly shady.**

Ask such questions as these:

- What are some places that get light from the sun most of the day?
✓ Work for open places such as playgrounds, fields, in the tree tops, gardens in the open, and so forth.
- What kinds of places are shady?
✓ Work for forest floors, beneath tall plants, on the shadow side of buildings and mountains, inside houses, and so forth.

5. **Have the students sort the wild plants into those that grew where it is mostly shady and those that grew where it was mostly sunny. Then have them sort the plants that were planted into those that were from shady places and those that were from sunny places.**

Ask such questions as these:

- Where did you find your plant?
- Did it grow where it is shady most of the time or sunny most of the time?
- Are planted lawn grasses found in mostly sunny or mostly shady places?
✓ If needed, have the students go to the window or outdoors and observe that grasses are found mostly in sunny places.
- Were there any plants that were found to grow in both sunny and shaded areas? What were they?
- Were there any plants that were found in both wild and planted areas? What were they?

6. **Have the students press their plants to make herbarium sheets and record information about them. Use Student Page K.4.2 PLANTS AND ENVIRONMENTS, one page per plant.**

Help the students do the following:

- Place the leaves, stems, flowers, and seeds on herbarium sheets and press them. See Activity K.4.1 PLANT PARTS.
- Record the name of the plant using botanical, common, or descriptive names.
✓ If a description is used, have the students indicate whether it is a shrub, grass, flowering plant, tree, and so forth.
- Record the date of collection and the name of the collecting botanists.
- Record the kind of place where the sample was found, whether it was a planted area or a wild area.
- Record whether the area where the plant grew was mostly sunny or mostly shady.
- Return to the concept map about plants and make additions.

7. Help the students put the herbarium sheets together to make a class book about where plants grow.

- Divide the book into sections with plants from environments that are *wild and shady*, *planted and shady*, *wild and sunny*, and *planted and sunny*.
- Have the students compare the different kinds of plants that grow in the four environments.
 - ✓ Are there any plants that live in all four environments? Which ones?
 - ✓ Are there any kinds of plants that live in only one of the four environments? Which ones?

8. Help the students use the class book about animals and environments from Activity K.3.6 ANIMALS AND ENVIRONMENTS to find which animals live in environments that are wild and not wild and sunny and shady.

EXTENSIONS

- Have the students collect additional plants on field trips and press them to show the different kinds of plants found in other shady and sunny environments.
- Have the students add pictures to the class book about where plants grow. This can include exotic plants in distant environments.



K.4.3 PLANT USES

OBJECTIVES

The students

- observe the dependence of animals on plants
- identify ways plants are used

BACKGROUND

PLANT USES is one of a series of activities on the study of plants. Other members of the series are K.4.1 PLANT PARTS, K.4.2 PLANT ENVIRONMENTS, K.4.4 GROWING BEAN SPROUTS, K.4.5 PLANTS AND WATER, and K.4.6 GARDENING. In PLANT USES the students classify plants according to their uses.

Uses of plants

Possible categories of use are for food, building materials, clothing, enjoyment, fuel, and animal homes. Some plants have multiple uses. This activity is designed to initiate thinking about the importance of the natural world of plants in the students' lives.

STUDENT ROLES

Botanist
Agricultural economist

MATERIALS

scissors
glue
magazines
markers
chart paper
Student Page K.4.3 PLANT USES

PRODUCTS

Class chart about plant uses
Completed Student Pages

PROCEDURES

1. Discuss the kinds of ways plants are used.

Ask such questions as these:

- What kinds of uses for plants were found on the concept map about plants?
- Do we eat plants and plant parts? Which plants? What plant parts?
- Why do we grow gardens?
- Why do we keep plants around our homes?
- Why do we have lawns?
- What do farm animals eat? How do you know?
- What do forest animals eat? How do you know?
- Do animals hide in plants? What kinds? Have you seen them? Where?

2. Have the students create categories of plant uses on a class chart.

Help them do the following:

- Suggest categories, starting with those on their concept map.
 - ✓ List the categories on the on the class chart.
 - ✓ Get at such uses as producing food, fuel, and building materials; preventing soil erosion; sheltering animals; and adding beauty to the environment.
- Suggest and record plants that fit into each category.

3. Have the students cut out or draw pictures of plants and sort them by uses.

Help them do the following:

- Add examples about plant uses to the class chart .
- Draw pictures or use cutouts to complete Student Page K.4.3 PLANT USES.

4. Summarize the activity.

Ask such questions as these:

- What examples of plants that people eat did you find?
- What examples of plants that wild animals eat did you find?
- What examples of plants that farm animals eat did you find?
- What examples of plants that are used for building materials did you find?
- What examples of plants that are used for fuel did you find?
- What examples of plants that protect wild animals did you find?
- What other uses for plants did you find?

EXTENSION

- Help the students create a class book or bulletin board about plant uses.



K.4.4 GROWING BEAN SPROUTS

OBJECTIVES

The students

- investigate the structure of seeds
- discover the parts of plants into which different parts of the embryo will mature
- investigate a way to grow bean sprouts

BACKGROUND

GROWING BEAN SPROUTS is one of a series of activities on the study of plants. It is designed to be done concurrently with K.4.5 PLANTS AND WATER and K.5.1 BEAN SPROUT SALAD and before K.4.6 GARDENING. Other activities in the series are K.4.1 PLANT PARTS, K.4.2 PLANT ENVIRONMENTS, and K.4.3 PLANT USES.

In this activity the students first investigate the structure of a lima bean. This can be done any time before the study of sprouting. Then they follow the development of mung beans or other sprouting seeds for 5 days. At the end of the 5 days they eat the remaining sprouted seeds. See Activity K.5.1 BEAN SPROUT SALAD.

Lima bean anatomy

Soak lima beans overnight. Have the students examine a bean to find seed parts. Because lima beans are large, their parts are easily identified. See Fig. K.4.4. When the students examine their mung bean they will find that it has the same parts.

Concurrent studies

On Day 1 of this investigation about 700 (about half a cup) of mung beans or other seeds are soaked overnight. Thirty or so dry seeds are saved for later dissection. On Day 2, two batches of seeds are wrapped in separate growing cloths. One batch contains 600 seeds; the other, 100 seeds. Starting on Day 3, the 60-100 seeds are not watered. The fate of these unwatered seeds is followed in Activity K.4.5 PLANTS AND WATER, which continues beyond GROWING BEAN SPROUTS through Day 8 or longer.

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The number of seeds is based on a class of 25 students, with each student using one germinating seed per day in each experiment and keeping the remainder for the salad activity. There is usually 85% to 90% germination with fresh seeds. Sprouting seeds need to be kept in a fairly warm environment of about 70° F for optimum growth.

The larger batch of 600 seeds is watered throughout this investigation with the final observation occurring on Day 5. On this day, Activity K.5.1 BEAN SPROUT SALAD can be done using the remaining watered bean sprouts. GROWING BEAN SPROUTS can be extended several more days, but the eating quality of the sprouts will deteriorate over time.

Selection of seeds for sprouting

Mung beans are suggested for use in this experiment because they are commonly found in salads. A half cup of dried mung beans will normally be sufficient for all investigations. Because mung beans are small, the students will need hand lenses for their first observation. If mung beans are not available, try other types of small beans or radish seeds. Radishes sprout well, but the seeds and sprouts are very small. Seeds for sprouting can usually be found in health food stores and some grocery stores.

When to start

The sprouting activity is designed to take 5 days. To complete the sprouting sequence, it should be started on a Monday and completed on a Friday.

Soaking beans

Soak the beans overnight in a jar of water to prepare them for sprouting. Do not leave them in the water for more than 24 hours or they will start to decompose. Rinse the beans before putting them on a growing cloth.

Growing cloth

A flour-sacking dish towel makes an excellent growing cloth for the larger quantity of sprouts. A smaller cloth can be used for the 100 seeds needed for Activity K.4.5 PLANTS AND WATER.

Keeping records

The students draw what they see each day and tape the bean- sprout parts that they observe to the student page.

Parts of seeds

Though this activity is not a study of nomenclature, students are usually curious about what things are called. For names of parts see Fig. K.4.4.

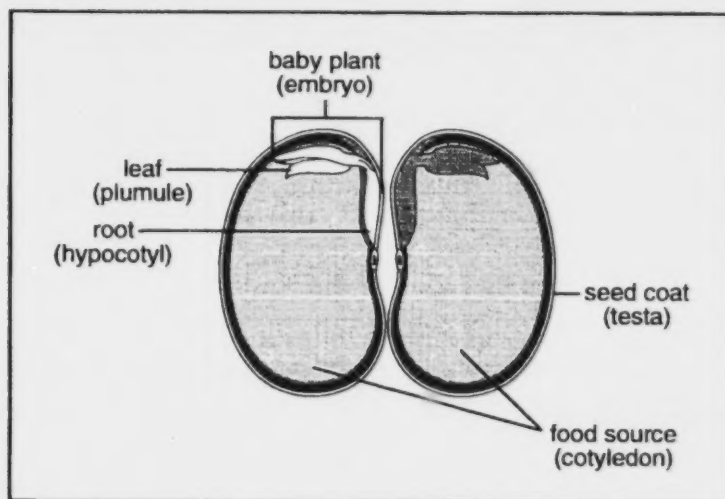


Fig. K.4.4 Parts of a bean seed

Further growing of mung beans

It is very exciting to include mung beans as one of the food-producing plants to be grown in Activity K.4.6 GARDENING. In that activity the students predict what parts of the seed will come out of the ground. Keep all records on a chart about seed predictions.

STUDENT ROLES

Botanist
Farmer

MATERIALS

chart paper
lima beans
1/2 to 1 cup of mung beans or other seeds (small beans or radish seeds)
for growing salad sprouts
2 flour-sacking dish towels
trays to hold cloths
quart jar
water source
tape
hand lenses
Student Page K.4.4 BEAN SPROUTS

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PRODUCTS

Class chart of seed predictions
Completed Student Pages

PROCEDURES

1. **Begin the study of plant development by having the students open a soaked lima bean and identify the parts. Have them use hand lenses to observe small structures.**

Help the students do the following:

- Review the use of hand lenses.
 - Observe the outside of a seed and draw it.
 - ✓ They will normally find a seed coat or thin outside covering of the seed.
 - Open a seed with a fingernail or toothpick and use a magnifying glass to observe it.
 - ✓ They will find the embryo with its miniature root and leaf structures.
 - ✓ In addition they will find two large whitish food sources that give the seed its shape.
 - Make drawings of the parts of the seed.
 - ✓ Have them use Student Page 4.4.4A LIMA BEAN.
 - Tape the parts of the soaked seed to the student page.
 - Name the seed parts and label the lima bean. See Fig. K.4.4.
 - ✓ The skin-like covering is called the *testa*.
 - ✓ They should be able to find the *embryo* or baby plant with its root or *hypocotyl* and the leaf structure or *plumule*.
 - ✓ In addition they will find the *cotyledons*, the large whitish food sources that give the seed its shape.
 - Put the pages with the attached seed parts in a plant press.
2. **Introduce the idea of growing bean sprouts. Start the study by examining dry seeds.**

Help the students do the following:

- Examine unsoaked bean seeds using hand lenses.
 - ✓ By pulling away the dry outer coat, they can see the two halves of the seed and open the seed.
- Look for parts that look like ones they saw in the lima bean.
- On Student Page K.4.4B BEAN SPROUTS draw pictures of what they see and label them.
- Tape the seed to the student page.

3. **Day 1. Prepare the seeds. Have the students put 1/2 cup of mung bean seeds in a jar of water. Allow the beans to soak overnight. Stress hand washing since sprouts will be eaten.**
4. **Day 2. Have the students examine the soaked bean seeds and prepare seeds for sprouting. Stress hand washing.**

Help the students do the following:

- Observe the outside of a seed and draw it.
 - Compare the parts of the soaked mung bean with the parts they previously found in the lima bean.
 - Make a drawing of the parts of the mung bean seed and label the parts.
 - Tape the parts of the soaked seeds to the Student Page K.4.4B BEAN SPROUTS.
5. **Make a large (about 600 or more seeds) and a small (about 60-100 seeds) bean-sprout seed-roll. The larger roll will be used in the rest of this sequence. Starting on Day 3 the smaller roll will be used with Activity K.4.5 PLANTS AND WATER. Once again stress hand washing.**
 - Wet two sacking dish towels by soaking them and squeezing out excess water.
 - For Activity K.4.5 PLANTS AND WATER spread 60 to 100 seeds evenly down the middle of a wet flour-sacking dish towel, leaving several inches around the outside.
 - ✓ Fold over the edges to keep the seed from spilling out.
 - ✓ Loosely roll the cloth up.

- Spread the remaining 600 or more seeds down the middle of the second wet flour-sacking dish towel leaving several inches around the outside.
 - ✓ Fold over the edges to keep the seed from spilling out.
 - ✓ Loosely roll the towel up.
- Dampen the towels thoroughly and when they stop dripping place them on a tray.
 - ✓ This will be the only time the batch of seed in the smaller cloth will be dampened.
 - ✓ The large dish towel should be soaked once each day.
 - ✓ DO NOT put water in the tray. This will drown the seeds.

6. Discuss what is known so far about bean seeds.

Ask such questions as these:

- What is the color of the outside of the dry seed?
 - ✓ It will be the same as the color of the coat of the soaked seed.
- Can anyone point to a seed coat on your student page? What is it like?
 - ✓ Get at such things as it is a very thin shell, skin, or wrapping—this is the *testa*.
- What did you find on the inside of the seed?
 - ✓ With a hand lens they probably saw the *cotyledons*, the *embryo* with its *plumule* and *hypocotyl*.
- What might each of the inside parts become? Record the class chart about seed predictions.

7. Day 3. Unroll a little of the large towel and have each of the students remove a bean for study. Once again stress hand washing.

Have each student do the following:

- Observe the seed and draw what they see from the outside on Student Page K.4.4B BEAN SPROUTS.
- Open their seeds carefully and use a hand lens to observe the parts.
- Tape the seed parts to the student page and label them.
- Continue to soak the towel once daily and after it stops dripping, put in back in its tray.

8. Discuss changes in the seed.

Ask such questions as these:

- What does the seed look like now?
- What do you think is coming out of the seed?
- What do you think will happen to the seeds in the small cloth if we don't water them?
 - ✓ Record predictions on the chart about seed predictions.
 - ✓ Do not open the small cloth at this time.

9. Start Activity K.4.5 PLANTS AND WATER with the seeds in the smaller cloth. Allow the cloth to dry out.**10. Day 4. Unroll a little more of the large cloth and have each of the students remove another bean for study. Stress hand washing since sprouts will be eaten.**

Have the students do the following:

- Observe the seed and draw what they see from the outside on Student Page K.4.4B BEAN SPROUTS.
- Open their seeds carefully and use a hand lens to observe the parts.
- Tape the seed parts to the student page and label them.
- Continue to soak the towel.

11. Discuss changes in the seed.

Ask such questions as these:

- What does the seed look like now?
- What do you think is coming out of the seed?
 - ✓ Record predictions on the chart about seed predictions.

12. Day 5. Unroll a little more of the towel and have each of the students remove another bean for study. Stress hand washing since the sprouts will be eaten.

Have each student do the following:

- Observe the bean seed and draw what they see on Student Page K.4.4B BEAN SPROUTS.

- Open their seeds, observe the parts, tape the seed parts to the student page, and label them.
- 13. Ask the students questions about the seed right before it is eaten.**
- What does the seed look like now?
 - Were your predictions about the seed parts correct?
- 14. Proceed to Activity K.5.1 BEAN SPROUT SALAD.**
-

EXTENSION

- Germinate other seeds such as alfalfa, wheat, radish, corn, or others for comparison.
 - ✓ Caution: DO NOT EAT sprouted seeds unless the sprouting seeds come from a health-food store and are intended for sprouting. Seeds intended for field and garden planting are often dipped in chemicals to ward off mold and insects.



K.4.5 PLANTS AND WATER

OBJECTIVES

The students

- make predictions about growth of unwatered seed
- carry out an experiment
- generalize that plants seem to need water
- generalize that living things seem to need water

BACKGROUND

PLANTS AND WATER is part of the study of plants. Other activities in the series are K.4.1 PLANT PARTS, K.4.2 PLANT ENVIRONMENTS, K.4.3 PLANT USES, K.4.4 GROWING BEAN SPROUTS, and K.5.1 BEAN SPROUT SALAD. PLANTS AND WATER is designed to be done concurrently with Activity K.4.4 GROWING BEAN SPROUTS.

Starting

PLANTS AND WATER should be set up on Day 2 of Activity K.4.4 GROWING BEAN SPROUTS when soaked bean seeds are divided into two different batches. The smaller batch of 100 seeds is used in PLANTS AND WATER beginning on Day 3. In the two activities the students simultaneously follow the development of watered and unwatered bean seeds. Out of this pair of investigations comes reinforcement for the idea that living things need water to survive.

Sampling sprouts

The 100 sprouts will be enough to have one for each of 20 to 30 students for three days (Days 4, 5, and 8). If the sprouts are started as suggested on a Monday, the last water-deprived sprouted seeds would be investigated the next Monday or Day 8.

STUDENT ROLES

Botanist
Farmer

MATERIALS

small bean-sprout seed-roll from Activity K.4.4 GROWING BEAN SPROUTS

Student Page K.4.4B BEAN SPROUTS
K.4.5 UNWATERED SPROUTS

PRODUCT

Completed Student Pages

PROCEDURES

1. **On Day 3 of the bean sprout growing in Activity K.4.4 GROWING BEAN SPROUTS use the beans in the small cloth, which will be allowed to dry. Review the question asked in Activity K.4.4, "What do you think will happen to the sprouts if we do not water them?"**

Ask such questions as these:

- How could we find out whether our predictions are right?
- How could we tell whether seeds without water are acting differently from seeds with water?

2. **Have the students tape a Day 3 sprout on Student Page K.4.5 UNWATERED SPROUTS and draw a picture of what they predict the unwatered bean sprout will look like on Day 4.**
3. **On Day 4 of the bean-sprout growing, open the unwatered cloth and look at the sprouts. CAUTION: Open the unwatered cloth after the watered bean sprouts have been inspected and put back in their tray. This prevents the transfer of any mold that may have started to grow in the unwatered sample.**

Have each student do the following:

- Compare a watered bean sprout and a sprout that received no water.
- Tape the unwatered sprout on Student Page K.4.5 UNWATERED SPROUTS.
- Ask what has happened to the unwatered bean sprouts.
 - ✓ How do they look different from the watered bean sprouts?
 - ✓ Were your predictions correct?

- Use Student Page K.4.5 UNWATERED SPROUTS to draw a picture of what they predict the bean sprout without water will look like on Day 5.
 - Wash their hands to get rid of any possible mold.
- 4. On the 5th day of the bean-sprout growing, open the unwatered cloth and look at the sprouts. Have each student compare a watered bean sprout with a sprout that received no water and tape the unwatered sprout on Student Page K.4.5 UNWATERED SPROUTS. Take precaution against mold contamination as above.**

Ask such questions as these:

- Were your predictions correct?
 - What do you think the sprout will look like Monday, Day 8?
✓ Have the students draw a picture of what they predict the unwatered bean sprout will look like on Day 8. Again use Student Page K.4.5 UNWATERED SPROUTS.
- 5. On the 8th day of bean-sprout growing, open the unwatered cloth and look at the sprouts. Have each student observe a sprout that received no water and tape the sprout on Student Page K.4.5 UNWATERED SPROUTS.**

Ask such questions as these:

- Were your predictions correct?
- What happens when sprouts are not watered?
- What did dry seeds seem to need to start to grow?
✓ Discuss the need for water.
- What happened when bean seeds were soaked in water overnight?
- What did you add to the bean seeds that grew into sprouts you could eat?
✓ Get at the idea that only water was added.
- What can you say about the need of plants and animals for water?
✓ Get at the idea that they both seem to need water to live and grow.

EXTENSION

- Have the students investigate what happens if grown potted plants are not watered. Rescue the plants before they die.



K.4.6 GARDENING

OBJECTIVES

The students

- plan a garden
- make and care for a garden
- grow and harvest foods
- observe and record the events in the development of their garden

BACKGROUND

GARDENING is the last activity in the study of plants. It is a summarizing experience involving many basic topics and can be readily tied into other subject matter areas. Once started, tending and observing the garden can be as unobtrusive as carrying out any routine responsibility.

GARDENING is designed to be done after K.4.1 PLANT PARTS, K.4.2 PLANT ENVIRONMENTS, K.4.3 PLANT USES, K.4.4 GROWING BEAN SPROUTS, K.5.1 BEAN SPROUT SALAD, K.4.5 PLANTS AND WATER, and K.10.8 LINEAR MEASUREMENT. It is usually followed by K.5.7 SNACKS FROM THE GARDEN.

When to start

Gardening is normally a spring activity. By spring the students are well advanced in their studies of plants, animals, and foods. If gardening needs to be done earlier, there will be no problem with outdoor gardening in places not affected by seasonal changes. Where seasonal changes prevent early outdoor gardening, indoor gardening can be substituted.

How long it will take

This gardening activity will take between one and three months, depending on the plants grown. Seed packets will give information on how long it takes to get a harvestable crop. During the time that the garden is growing, there will be many days when garden care will not be necessary.

Outdoor garden

The basic objective of the gardening experience is satisfied if the students have several kinds of food plants that go completely through their growth cycle from seed to fruit or seed. It can be done as a single garden for the entire class or as a collection of group plots. If work is to be done using

group plots, an outdoor class area 3 ft x 6 ft (1 m x 2 m) will be adequate. This gives six nice-sized plots, 1-1/2 ft x 2 ft (1/2 m x 2/3 m). Where outdoor garden areas already exist and assistance from parents, janitorial staff, or older students is available, a garden can be fairly large and still manageable. It will be helpful to do Procedures 3 and 4 of K.10.8 LINEAR MEASUREMENT before laying out garden plots.

Indoor gardens

Gardens can also be grown indoors in sturdy cardboard boxes covered with a plastic bag, in kitty litter pans, or in a molded-plastic swimming pool. If a sun-exposed window cannot be found, use a grow-light. Three to four inches of soil will be sufficient to support many crops such as the quick-growing plants listed below.

Quick-growing plants

Radishes, lettuce, mung beans, bush beans, and cherry tomatoes will sprout and grow reasonably rapidly.

Experimental opportunities

There will be many opportunities to experiment with plants. If questions arise that can be tested, encourage experimentation. Easily tested questions might include the following:

- Is it better to plant one seed or several together?
- What happens if you don't weed around a plant?
- Will seeds grow if they are placed on top of the ground?

Be sure that all experiments are marked so that failures and successes can be observed.

Focus Books

The Focus Books have been designed to give the students a feel for the many things that must be planned for in making and tending gardens. They should be used in the first phase of the activity.

Steps in gardening

The major steps in the gardening process include the following:

1. **Garden planning.** This is fundamental because it brings the steps in garden project into focus before operations begin. Further planning will need to be done throughout the project.
2. **What to grow.** Help the students decide which plants to grow. Some quick-growing plants are listed above.
3. **Plot marking.** If outdoor plots are to be used, the students will usually need to measure the length and width of their garden and put in stakes to hold boundary string. See Activity K.10.8 LINEAR MEASUREMENT. Stakes will also be needed to hold string to mark off group plots. The stakes can be driven down so they are just above the ground. The strings can be taken up after working in the garden and put back when work is going on.

4. **Soil preparation.** If the plot is outdoors, spading or tilling will usually be necessary. Depending on the size of the garden and soil condition, this can be a major task requiring assistance from adults or older children. If a planting box or other small container is used, the students will be able to loosen the soil with hand trowels.
5. **Soil fertilization.** If the third-grade *DASH* program is in place, compost may be obtained from its supply. Compost or fertilizer from other sources can also be used. If needed, consult your grounds or janitorial staff or get advice from a local garden shop on appropriate fertilizers.
6. **Seed planting.** Information on planting can be found on the back of seed packets. Garden shop personnel and experienced gardeners are another quick source of information. *Seed packets should be saved!* There is much information on them.
7. **Watering.** Follow the directions on the seed package.
8. **Weeding.** Weed whenever foreign plants are found. This will provide an ideal opportunity to get samples to further investigate the anatomy of plants.
9. **Special care.** Staking and thinning should be done as needed. See instructions on seed packets. Whenever insects or other bugs come into the garden, help the students find out whether they are destructive. Praying mantises, ladybugs, and spiders actually hunt harmful insects. Bug removal by hand provides an ideal chance to reinforce earlier insect studies. A soapy-water spray will deter most bugs. Planting marigolds, garlic, and hot peppers helps in bug control.

CAUTION: If it becomes necessary to spray pesticide or other chemicals, the spraying should be done by an adult, and students should be kept out of the garden for several days.
10. **Harvesting.** When to pick fruits and vegetables can be guided by information on seed packets. Looking at similar foods in the grocery store gives an idea of what ripeness is. There is always the advice of those who have gardened before.
11. **Preparing food for eating.** This is an exploration that can be planned by the students. If the preparing is done with adults, try to ensure that the students do as much of the preparation as possible. All products from the garden should be thoroughly washed. See K.5.7 SNACKS FROM THE GARDEN.

- 12. Cleaning the garden.** Digging up and observing plants after they have been harvested is a marvelous reinforcement of previous studies on plant anatomy. Plant waste can be added to the DASH 3 compost pile.

Safety

In the garden as in the classroom, safety is a primary concern. Stress such things as always putting rakes and hoes on the ground with prongs and blades down so there will be no punctures or cuts if they are stepped on. Carry equipment with blades and prongs down to prevent punctures and cuts in case one falls. Have a limited number of people using tools at any one time. *Insist that the students do not play in the garden.*

Hygiene

At the end of each day's garden work the students should remove their shoes and clean off dirt, remove any clumps of dirt from their clothes, and most importantly, thoroughly wash their hands and clean under their fingernails.

Care of equipment

The gardening activity gives practical experience in how to care for equipment. At the end of each day's work in the garden, equipment should be cleaned, metals should be lightly oiled, and all items should be properly stored. Oily sand in a bucket will work to clean and oil tools.

Recording

Record major gardening events on the Learning Calendar. Charts and displays can also be made. Pictures, either photos or student drawings, can tell the tale of working in the garden. Attaching real plant parts to charts and making pressings of plants at different stages of development greatly enhance the visual impact of the activity.

Additional information

Information about gardening can be gotten from nurseries, experienced gardeners, and grounds staff.

STUDENT ROLES

Gardener
Farmer

MATERIALS

Focus Books: *Wake Up, Garden!*
Planning a Garden
Planting a Garden

chart paper
markers

For an indoor garden

plastic-covered cardboard boxes, kitty litter pans, a molded-plastic swimming pool, or other containers for soil
 fertilizer or compost
 rulers
 seeds—limit height of plants to 18 in
 trowels, hand cultivators
 hose or watering can
 grow-lights—if no window light

For an outdoor garden

garden plot
 spading fork or rototiller
 fertilizer or compost
 oily sand in a bucket
 rulers
 seeds
 stakes
 string
 shovels
 rakes
 hoes
 watering hose
 water source
 soapy water

Comparing Strings from Activity K.10.8 LINEAR MEASUREMENT

class chart about carnivores, herbivores, and omnivores from Activity

K.3.12 ANIMALS AND FOOD

Responsibility Chart

Student Pages K.4.6A HOW MANY?
 K.4.6B HOW TALL?
 K.4.6C GARDEN GROWTH

PRODUCTS

Additions to the class chart about carnivores, herbivores, and omnivores from Activity K.3.12

Class garden map

Class chart about planning a garden

A garden

Snack vegetables and fruits

Completed Student Pages

PROCEDURES

1. **Introduce the garden activity by reading the Focus Book *Wake Up, Garden!***

Ask such questions as these:

- Where do the fruit and vegetables you eat come from?
✓ Work toward the idea that they are grown by someone.
- Has anyone helped with a garden?
- Does anyone know someone who has a garden?
- What do they grow?
- What do they have to do to grow food in a garden?

2. **Introduce the students to the outdoor garden or containers they will use.**

3. **Read the Focus Books *Planning a Garden* and *Planting a Garden* to introduce gardening steps.**

Ask such questions as these:

- What are the things that have to be done to grow a garden?
✓ List these on a class chart about planning a garden.
- In what order do you have to do those things?
✓ Sequence the items in the list.

4. **Help the students decide which plants to grow.**

- Consider the idea of using special plants for insect control.
✓ Think about planting marigolds, hot peppers, or garlic.

5. **If the garden is to be outdoors and divided into plots, help the students mark boundaries and map their garden.**

Start by asking such questions as these:

- How can you mark the garden so you can always find your plots?
✓ Get at the idea of putting in stakes and tying string to them.
- What do you do with the string when you are not working in the garden?
✓ Get at the idea of taking down the string.

- How can you keep a record of where different plots are located?
✓ Get at the idea of making a class map of their garden.
✓ Help the students make their map of the garden.

6. Help the students prepare the soil by loosening and fertilizing it. Have them clean and oil garden tools after the work is finished.

Start by asking such questions as these:

- How does breaking up the soil help you gardening?
✓ Get at the idea that it allows you to plant the seed easily.
- Why do we need fertilizer or compost?
✓ Get at the idea that just as our bodies need food, so plants need fertilizer to grow.
- Why do we clean, oil, and store garden tools after working with them?
✓ Get at such things as preventing rust and keeping dirt out of storage areas.

7. Read the information about planting on the back of seed packets.

Ask such questions as these:

- How deep did the packet say you should plant our seeds?
- How can you be sure that the seeds are planted at that depth?
✓ Get at the idea of using a ruler.
- How far apart did the packet say that we should plant our seeds?
- How can you be sure that they are planted that far apart?
✓ Get at the idea of using a ruler.

8. Have the students plant their garden.

Help them do the following:

- Count the number of each kind of seed planted and record the number on Student Page K.4.6A HOW MANY?
- Save the seed packets.
- Clean, oil, and store garden tools.

9. Set up a special Responsibility Chart for garden jobs along with job descriptions.

- Discuss and identify the jobs that will need to be carried out.
 - Discuss and identify the need for a watering schedule.
 - Discuss and identify the need for a botanist to observe what is happening in the garden.
- 10. Have the students observe and count the number of seeds that sprout. Have them record their data on the Student Page K.4.6A HOW MANY?**
- 11. Have groups of students identify and measure the height of one plant once or twice a week until the plant is fully grown. Help them record their data on Student Page K.4.6B HOW TALL?**

Ask such questions as these:

- Does your plant grow about the same amount each time you measure it?
 - Does your plant ever seem to stop growing?
 - Does your plant ever get shorter? If so, why?
 - Does your plant grow about the same way as other plants that are like it? If not, how is it different?
 - Do other kinds of plants grow the same way your plant is growing?
- 12. Watch for evidence of weeds coming into the garden. Add weeding to the Responsibility Chart for garden jobs.**

Ask such questions as these:

- Are there any new or different kinds of plants growing in your part of the garden?
- Do all of the sprouts look the same when they come up?
- Did all the sprouts come up at the same time?
- Did all of the sprouts come from seeds you planted?
- How did you tell which sprouts came from the seeds that you planted?
✓ The students should know approximately where they planted seeds.

- What do you think might happen if you let all these plants grow?
- How could you get rid of the plants you don't want?
 - ✓ Supervise their first weeding so that they don't pull their garden plants.

- 13. Have the students observe the pulled weeds to review the parts of plants. You may want to have the students press some and add them to the earlier collections from Activity K.4.1 PLANT PARTS.**

Ask such questions as these:

- Do weeds have roots? If so, what are they like?
- Do weeds have stems? If so, what are they like?
- Do weeds have leaves? If so, what are they like?
- Do weeds have flowers? If so, what are they like?
- Do weeds have seeds? If so, what are they like?
- What is a weed?
 - ✓ Get at the idea that it's any plant that you don't want.

- 14. Have the students watch for evidence that plants need to be staked. Help them stake the plants as necessary.**

Ask such questions as these:

- Does anyone have plants that look as though they are going to fall over?
- How might you hold them up?

- 15. Have the students watch for evidence that insects and other bugs are attacking their plants.**

Ask such questions as these:

- Has anyone noticed insects or other bugs in the garden?
- What are they doing in the garden?
- Are these helpful or destructive insects or other bugs?
- How can you tell if they are destroying our plants?
 - ✓ Look for leaves or flowers that are being chewed up.
- How can you tell whether they are helpful?

- ✓ Look to see whether they are eating other bugs.
- ✓ Helpful insects include the praying mantises, spiders, and ladybugs.

- How might you get rid of insects and other bugs that destroy your plants?
 - ✓ Work toward such ideas as removing infected leaves or plants, washing leaves with soapy-water, and removing the insects or bugs by hand.

- 16. Have the students treat leaves and remove harmful insects and other bugs. Have them observe the insects and other bugs and add their observations to the class chart about carnivores, herbivores, and omnivores from Activity K.3.12 ANIMALS AND FOOD.**

Ask such questions as these:

- What do the insects and other bugs in the garden look like?
 - What body parts can you find?
 - ✓ Head, eyes, antennae, legs, abdomen, thorax, wings?
 - What kinds of bugs are they? Are they insects, spiders, caterpillars, or others? How do you know?
 - What are the insects and other bugs eating? Are they carnivores, herbivores, or omnivores?
 - What happened to your plants after you removed harmful bugs?
- 17. Have the students harvest their garden when fruits and vegetables appear ready and prepare them for eating. See Activity K.5.7 SNACKS FROM THE GARDEN.**
- 18. Have the students clean up their garden and transport the waste to the DASH 3 compost pile if it is still receiving waste. Clean, oil, and store garden tools.**
- 19. Summarize the activity using Student Page K.4.6C GARDEN GROWTH.**
- Put the pictures into the correct sequence.
 - Discuss the sequencing.

EXTENSION

- If any plants produce seeds, plant a few and start the cycle again. Getting the seeds to germinate and produce their first leaves is enough to validate the growth cycle.



PLANT PARTS
SP K.4.1

Name _____

Date _____

Make a whole plant by taping plant parts to this page.
Label the parts.



**PLANTS AND
ENVIRONMENTS
SP K.4.2**

Name _____

Date _____

NAME OF PLANT

WILD AREA

WILD AREA

Shade

☐

Sun

☐

PLANTED AREA

PLANTED AREA

Shade

☐

Sun

☐

PLANT



PLANT USES
SP K.4.3

Name _____

Date _____

PLANT	USE

**LIMA BEAN**
SP K.4.4A

Name _____

Date _____

Draw the opened lima bean. Label the seed parts.



BEAN SPROUTS
SP K.4.4B

Name _____

Date _____

DAY	TAPE SEED	DRAW WHAT YOU SEE
1		
2		
3		
4		
5		



**KINDS OF GIVING
AND RECEIVING
SP K.4.05**

Name _____

Date _____

DAY	Tape sprout below	Draw what you think this sprout will look like
3		on DAY 4
4		on DAY 5
5		on DAY 8
8		



**HOW MANY?
SP K.4.6A**

Name _____

Date _____

KIND OF SEED	HOW MANY SEEDS?	HOW MANY SPROUTS?



HOW TALL?
SP K.4.6B

Name _____

Date _____

KIND OF PLANT	
DATE	HOW TALL?

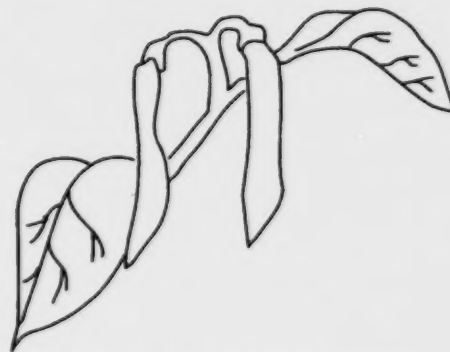
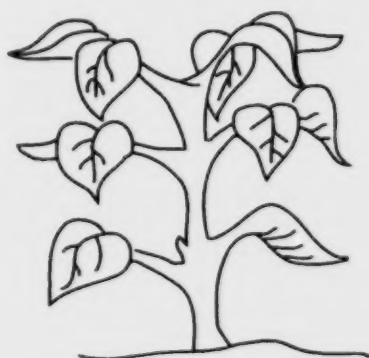


**GARDEN
GROWTH
SP K.4.6C**

Name _____

Date _____

Cut out the pictures. Put them in order.





**KINDERGARTEN
CLUSTER 5**

Food and Nutrition

- K.5.1 Bean Sprout Salad
- K.5.2 Drinks
- K.5.3 Flour and Bread
- K.5.4 Familiar Foods
- K.5.5 Favorite Foods
- K.5.6 New Foods
- K.5.7 Snacks from the Garden



K.5.1 BEAN SPROUT SALAD

OBJECTIVES

The students

- prepare salads with the bean sprouts they have grown
- invent ways of making salads more tasty using salad dressing
- are introduced to the importance of salads in the diet

BACKGROUND

BEAN SPROUT SALAD usually follows Activity K.4.4 GROWING BEAN SPROUTS. This is often a first opportunity for the students to eat something that they have grown. BEAN SPROUT SALAD is one of a series of activities about foods. Other activities in the series are K.3.12 ANIMALS AND FOOD, K.5.2 DRINKS, K.5.3 FLOUR AND BREAD, K.5.4 FAMILIAR FOODS, K.5.5 FAVORITE FOODS, K.5.6 NEW FOODS, and K.5.7 SNACKS FROM THE GARDEN.

Starting

BEAN SPROUT SALAD brings closure to Activity K.4.4 GROWING BEAN SPROUTS. In GROWING BEAN SPROUTS the students follow the growth of mung beans from seeds to edible sprouts. Now they harvest those sprouts, experiment with salad making, and taste their products. If for some reason the sprouts from the experiment become inedible, substitute fresh sprouts from the grocery store.

Expanding food preferences

In BEAN SPROUT SALAD the students investigate the taste of plain raw sprouts and sprouts with different dressings. This is part of an effort to broaden acceptance of a wide variety of foods. Salads are not part of the daily menu of many students and are often rejected because of lack of experience in eating them. The introduction of dressings as taste changers is an inviting way to encourage students to eat salads. The idea of expanding food acceptance is further explored in K.5.6 NEW FOODS.

STUDENT ROLES

Salad chef
Food service person
Home food preparer

MATERIALS

1-in. grid paper
 markers
 soap
 paper towels
 newspaper
 bean sprouts from Activity K.4.4 GROWING BEAN SPROUTS or from a
 grocery store
 colander for washing sprouts
 small disposable plates
 3 or more different kinds of salad dressings
 plastic forks
 serving bowl
 food handler's plastic gloves
 aprons
 Student Page K.5.1 BEST SALAD

PRODUCTS

Graph ranking bean sprouts with different dressings
 Salads
 Completed Student Pages

PROCEDURES

1. **On the last or next-to-last day of Activity K.4.4 GROWING BEAN SPROUTS, prepare the students for making bean sprout salads.**

Ask such questions as these:

- How are beans sprouts eaten?
✓ Work for such things as in sandwiches, in salads, in Chinese dishes, and so forth.
- If you made them into a salad, what else would you need?
✓ Get at containers, utensils, salad dressing, and so forth.
- Why do we wash our hands before working with food?
- Why do we wash vegetables before preparing them for eating?

2. **Wash the sprouts and place them in serving bowls.**

Have the students do the following:

- Wash their hands.
- Put a few sprouts on a plate.

- Put small dabs of various dressing on the plate.
- First eat a raw bean sprout without dressing.
- After eating a raw sprout, eat bean sprouts dipped in various dressings.
- Rate the sprout-and-dressing combination that they like the best, second best, and so forth.
- Recording their rating on Student Page K.5.1 BEST SALAD.
- Graph the number of students who liked each of the ways to eat sprouts the best.
 - ✓ Include raw sprouts and sprouts with each kind of dressing.

3. Summarize the eating of the bean sprouts.

Ask such questions as these:

- How do you like raw bean sprouts?
- Which of the ways of eating bean sprouts did the most people prefer?
 - ✓ Refer to the graph.
- Did any anyone prefer the beans sprouts without dressing as a salad?
 - ✓ Refer to the graph.
- How can you change the taste of foods?
- Does anyone know why bean sprouts are considered to be a very good food for us?
 - ✓ Lead toward the idea that they contain things that our bodies use in growing and staying strong.
- Are there other salad vegetables that you might eat with dressing on them?
 - ✓ Discuss the question and encourage the students to try out other salad vegetables with dressings they like.
 - ✓ Periodically ask the students whether they are eating more salad vegetables.
- Do you think your classroom pet would like bean sprouts?
 - ✓ If the pet is a herbivore, have the students test to see.

EXTENSIONS

- Prepare salads of other sprouted seeds to see how they taste compared to bean sprout salad.
- Cook some bean sprouts with a little soy sauce and other seasonings and rate their taste.
- If the school food lunch manager is not already providing a choice of dressings, suggest that a choice be offered occasionally to see whether there is a decrease in the salad plate waste.
✓ Experience elsewhere indicates that there will be a decrease in plate waste whenever students can select their dressing.



K.5.2 DRINKS

OBJECTIVES

The students

- make snack drinks
- observe that the things people drink contain mostly water
- create a pictorial recipe for their drink
- practice volumetric measurements
- practice habits of good sanitation

BACKGROUND

DRINKS usually follows Activity K.3.13 ANIMALS AND WATER and K.4.5 PLANTS AND WATER. DRINKS continues to look at water as a universal biological need of plants and animals and is part of a larger series about foods. Other activities in the series are K.5.1 BEAN SPROUT SALAD, K.5.3 FLOUR AND BREAD, K.5.4 FAMILIAR FOODS, K.5.5 FAVORITE FOODS, K.5.6 NEW FOODS, and K.5.7 SNACKS FROM THE GARDEN.

Water content of drinks

DRINKS develops the idea that the liquids people and other animals drink are mostly water. The activity is built around the addition of water to dehydrated and concentrated forms of drinks—orange juice, milk, punch, and so forth. This activity can be returned to anytime snack drinks are made.

Recipes

The students also begin to develop the concept of a recipe as a set of directions for preparing food. This concept of recipes and formulas will be developed throughout *DASH*. Here the students make a pictorial recipe to reinforce the idea that the same drinks can be made later when they use the same recipe.

STUDENT ROLES

Food preparer
Food service worker

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MATERIALS

drinking cups
 large mixing container
 measuring cups
 mixing spoons
 aluminum foil
 powdered milk, dehydrated drink mixes, juice concentrate, and so forth
 water source
 food handler's plastic gloves
 aprons
 Student Page K.5.2 SNACK DRINKS

PRODUCTS

Snack drinks
 Completed Student Pages

PROCEDURES**1. Review the topic of water and drinking.**

Ask such questions as these:

- What do animals drink besides water?
- What do you drink besides water?
- What is in the things that you drink?
- Is there water in the things you drink?

2. Help the students prepare snack drinks.

- Have the students wash their hands before starting the preparation of the drink.
- Read the recipe for the drinks to them.
- Help them measure out the ingredients and mix the snack drink.
- Have them sample the final mixture to see that the reconstituted drinks are in fact milk, orange juice, and so forth.

3. Have the students make pictorial recipes for the drinks they have made. Have them use Student Page K.5.2 SNACK DRINKS.

Help them do the following:

- Create logos or pictures for each of the ingredients.
- Make the pictorial recipe
 - ✓ Numbers of cups, tablespoons of solids, and so forth can be shown in pictures or numbers or both.

4. Summarize the activity.

Ask such questions as these:

- Why did we wash our hands?
- When we made our drinks, which ingredient was there the most of?
 - ✓ Emphasize that it was water.
- What made the mixture a liquid?
 - ✓ Get at the idea that it was the water.
- Are there other drinks people make with water?
 - ✓ Get at such drinks as tea, coffee, cocoa, and so forth.
- Does anyone know the word *dehydrated*? What does it mean?
- Can you think of any drinks that don't contain water? What are they?
 - ✓ Encourage such contributions as sodas and other bottled drinks. Ingredients can be found on labels.
 - ✓ Put questionable drinks in the Wonder and Discover Book.
 - ✓ Reserve finding answers about questionable drinks for *DASH 1* where the students will use cobalt chloride paper to test for water.
- How much water should you drink each day?
 - ✓ The aphorism below is a good reminder.

Remember, drink water!
Six glasses in winter
And eight in summer
Are the body's natural plumber.

EXTENSIONS

- Have the students bring in recipes for other drinks. Help them note what kinds of liquids are used.
- Have the students try to dehydrate the drinks they have just made.
 - ✓ Work to the idea of letting some of the drink dry out to see what is left behind. Have them put a few drops of the drink on aluminum foil and put it in the sun.
 - ✓ Have them taste the dehydrated residue.
- Have the students look for other dehydrated foods.



K.5.3 FLOUR AND BREAD

OBJECTIVES

The students

- observe how flour is made from seeds
- compare the taste of raw and cooked ingredients of bread
- create a pictorial recipe for bread
- practice volumetric measurements
- practice habits of good sanitation

BACKGROUND

FLOUR AND BREAD usually follows K.5.2 DRINKS where the use of recipes is introduced. FLOUR AND BREAD is a member of the food series. Other members of the series are K.3.12 ANIMALS AND FOOD, K.5.1 BEANS SPROUT SALAD, K.5.2 DRINKS, K.5.4 FAMILIAR FOODS, K.5.5 FAVORITE FOODS, K.5.6 NEW FOODS, and K.5.7 SNACKS FROM THE GARDEN.

FLOUR AND BREAD introduces compound foods or foods made from several food components and gives insight into how cooking transforms the taste of individual ingredients.

Organization

The activity is divided into two parts. In the first the students make corn flour or meal. In the second they use cornmeal to make cornbread.

Grinders

Ideally the students will use metates or grinding stones to make flour. If it is difficult to get metates, two pieces of flat sandstone or lightweight concrete bricks can be used.

The making of the flour should be a demonstration with student participation. All grinding surfaces should be scrubbed with brushes using soap and water.

Use grinding only as a demonstration to show how cornmeal is still made by some people. Commercial cornmeal should be used for the actual recipe.

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Grain

Dried corn on the cob can often be found in supermarkets, particularly in the fall around Halloween and Thanksgiving. Popcorn will also make an interesting meal though it is difficult to break up.

CAUTION: Do not use *planting seed corn*. Commercial seed corn often is coated with pesticides.

Recipe

Any simple cornbread recipe can be used. Here is one that works on a lightly oiled electric frying pan or griddle. See Fig. K.5.3. The portions are for twenty-five 3-in. (7.5-cm) disks. Cook as you would a pancake, turning once.

**Recipe for
Corn Griddle Bread**

COMBINE

2/3 cup BREAD FLOUR

1 teaspoon SALT

1 tablespoon SUGAR

4 teaspoons BAKING POWDER

COMBINE

1-1/2 cups BOILING WATER

1-1/3 cups CORNMEAL

1 tablespoon COOKING OIL

3/4 cup MILK

MIX INGREDIENTS

COOK ON A HOT GREASED GRIDDLE

Fig. K.5.3 A recipe for corn griddle bread

STUDENT ROLES

Miller
Baker
Food taster
Food service worker

MATERIALS

metate, grinding stones, or lightweight concrete blocks
dried corn or popcorn
commercial cornmeal
cornbread ingredients
jelly
butter or margarine
source of hot water
electric fry pan
pancake turner
mixing pan
mixing spoon
measuring cups and spoons
soap
dish pan
brush
food handler's plastic gloves
aprons

Student Page K.5.3 INGREDIENTS AND TASTE

PRODUCTS

Class Corn Griddle Bread Recipe Chart
Corn disks
Completed Student Pages

PROCEDURES**1. Explore what students know about cornbread.**

Ask such questions as these:

- What do you think cornbread is made of?
✓ Record their answers.

- What color is cornbread?
 - What color is most of the corn you see in the market?
✓ Work for yellow and white though many students will have seen varicolored Halloween corn.
 - How might cornbread get its color?
✓ Work for the idea that color comes from the corn kernels or other ingredients.
 - How do you think corn is ground?
 - What do you think ground corn looks like?
 - Does anyone know what ground up corn is called?
✓ Get at the term *flour* or *meal*.
- 2. Show the students a metate, grinding stones, or other flour-grinding tools. Help the students clean the stones or other tools and grind some corn.**
- Ask such questions as these:
- Why do we clean the grinding tools before using them?
 - Why do we wash our hands before working with foods?
 - How does the metate or other tools allow us to grind grain?
✓ Investigate the rough surface of the stones.
✓ Have them rub the end of a stick over a smooth surface such as a metal pan, then have them rub its end over the stone.
 - How fine is commercial cornmeal compared with the meal or flour you have made?
✓ Compare the commercial and the hand-ground meal.
 - How does the raw corn flour taste? Do you like it?
✓ Have them record their likes or dislikes of ingredients on Student Page K.5.3 INGREDIENTS AND TASTE.
- 3. In preparation for bread making have the students wash all utensils.**

Ask such questions as these:

- Why do you wash utensils?
- What evidence do you have that washing cleans surfaces?

✓ Have the students look at the water before and after cleaning the utensils.

- Where might dirt come from?
- ✓ Get at such ideas as from dust in the air, people handling the utensils, dirt left on the utensils, and so forth.

4. Introduce a cornbread recipe. Help the students use pictures to make a class chart of the cornbread recipe.

Ask such questions as these:

- What do you mean by a recipe? Ingredients?
- What ingredients does this recipe call for?
- How did you show cups, tablespoons, teaspoons?
- Which is larger, a tablespoon or a teaspoon?
- How can one show mixing? Frying? Baking?

5. Have the students taste each of the ingredients to be used in the batter separately and rate how they like them on Student Page K.5.3 INGREDIENTS AND TASTE.

Ask such questions as these:

- How many like the taste of the salt? The sugar? The oil? The cornmeal? The baking powder?
- ✓ Record the numbers.
- Would you want to make a meal of any of the ingredients?

6. Help the students prepare the batter and rate how they like its taste on Student Page K.5.3 INGREDIENTS AND TASTE.

Have them do the following:

- Measure out ingredients.
- Mix the batter.
- Taste and rate the uncooked batter.

7. Fry or bake the bread and again have the students taste it. Have them add margarine or butter to a bit of the bread and taste it, then add jelly and taste it. Have them rate how they like the taste on Student Page K.5.3 INGREDIENTS AND TASTE.

Ask such questions as these:

- Does the bread taste like the batter?
- What do you think could have happened to change the taste?
✓ Get at the observation that the only change was heating, therefore, heating changed the ingredients.
- How many like the bread better than the raw batter?
- How has cooking change the taste of things?
- Does jelly make the bread taste better?
- Does butter or margarine make the bread taste better?
- How can you change the taste of foods?
✓ Get at adding butter, jelly, and salad dressings; cooking for example bean sprouts, or meat; making a composite cooked food such as cornbread.

EXTENSIONS

- Graph the number of students who liked each of the items tested.
- Make a collection of different kinds of flour. Put them in clear plastic bags.
✓ Identify what seeds the different kinds of flour are made from and what foods they are used to make. Record and attach the information to the bags.
- Make and taste bread made from different kinds of flour.



K.5.4 FAMILIAR FOODS

OBJECTIVES

The students

- continues the study of food as a basic biological need of all animals
- begins the study of the body's need for a variety of foods
- create an ABC book about foods
- identify foods from pictures
- start to build the idea that good nutrition requires a variety of foods.

BACKGROUND

FAMILIAR FOODS is part of a series of activities designed to broaden the students' recognition of foods. This series reinforces the idea shared in Activity K.3.12 ANIMALS AND FOOD that all animals, including humans, have a basic biological need for food. FAMILIAR FOODS is usually followed by Activities K.5.5 FAVORITE FOODS and K.5.6 NEW FOODS. Other members of the series are K.5.1 BEAN SPROUT SALAD, K.5.2 DRINKS, and K.5.7 SNACKS FROM THE GARDEN.

In FAMILIAR FOODS the students consider why they need to eat food. They then explore what people eat by making an ABC book about foods they know. At the same time they make game cards showing the same foods found in the ABC book and use them in a food identification game.

Eating

The question of why people need to eat is not usually answerable from observations made in the classroom. However, children who watch TV may be exposed to scenes of starvation and may be able to draw on this experience to begin to understand that all animals including humans must eat to survive. The students also have had the experience of feeding animals and know that they get hungry themselves. Out of this they can begin to focus on why all animals need food. From such a beginning will come later *DASH* studies of why people eat a wide variety of foods and what different foods provide for their bodies.

ABC Book of Foods

The students begin by cutting out pictures and gluing them to lettered pages of an ABC Book of Foods. The pages are then alphabetized and bound. A "big book" format with one letter per page is suggested.

Food Card Game

The students glue pictures of the same foods found in the ABC book on Student Page K.5.4 FOOD CARDS or on 3 x 5-in. cards for the Food Card Game. They use the cards to practice identifying foods in a game setting.

The students may not want to collect pictures of foods that they do not eat regularly. This may lead to a very limited set of cards. If this happens, the set can be expanded by using cards with foods that the students have seen others eat, adding cards from sets made in previous years, or adding cards you suggest.

Sources of pictures

Some easily available sources of pictures are food ads in newspapers and home-oriented magazines.

Expert status

The makers of game cards place their initials or name on the front of the cards they make and become the experts for that food. This gives a special ownership to their work.

STUDENT ROLE

Food expert

MATERIALS

large paper for the ABC Book of Foods
 markers
 magazines and newspapers with food pictures
 scissors
 glue
 Student Page K.5.4 FOOD CARDS or 3 x 5-in. cards

PRODUCTS

Food cards
 Class ABC Book of Foods
 Completed Student Pages

PROCEDURES**1. Discuss why we need to eat.**

Ask such questions as these:

- Why do we need to feed our pets?
- What happens to animals that are not fed?
 - ✓ Explore what the students know about animals that can't find food in the winter, times of drought, or other.
- Why do you think you need to eat?
 - ✓ Work for such things as making our bodies grow and work.
 - ✓ People have the same need as other animals.
- Why do you think that you eat different kinds of foods?
 - ✓ Play with the idea that different foods might provide different things that you need.

2. Have the students create an ABC book of foods they know and would like to know.

Help them do the following:

- Cut out *pairs* of pictures of different foods they know from magazines or newspapers.
- One by one, help them find *A* food pictures, then *B* food pictures, then *C*, and so forth.
 - ✓ Ideally there will be several different foods under each letter.
- Attach only one example of any one food to pages of the book.
 - ✓ Keep duplicates for Procedure 3.
- Write the names of the foods only under the pictures in the ABC Book of Foods.
 - ✓ Don't write names on the duplicates at this time.
- Repeat the procedure for each letter in the alphabet.
 - ✓ Don't permanently bind the book until the food series of Activities K.5.4-K.5.6 is completed.

- If food pictures can't be found for some letters, have the students use reference books to find names of foods and draw them.
- ✓ A pictorial dictionary is an excellent resource.

3. Help the students create a set of Food Cards from the duplicate pictures not used in the book. Ideally all cards should have pictures of foods already in the big book, and there should be one or more cards for each food picture in the book. Use Student Page K.5.4 FOOD CARDS or 3 x 5-in. cards.

Have the students do the following:

- Glue the pictures to the frames on Student Page K.5.4 FOOD CARDS or on 3 x 5-in. cards. Cut out the frames from the student page.
- Put only one picture of a particular food on a card.
- ✓ If pictures are large, fold them.
- Put their initial below the pictures on the cards they make.
- On the back of the cards copy the name of the food from the ABC Book of Foods.
- ✓ The student whose initial is on the card becomes the "food expert" on the food that is named.
- Check to see that the pictures are glued down well and that the glue is dry.
- Collect the cards for the Food Card Game.

4. Explain the Food Card Game to the students.

Rules of the game:

- Play in groups of 2-4 people.
- Use a deck of 3 cards per person (6-12 cards).
- Place a card deck on the table. Turn one card at a time face up as play proceeds.
- Decide who goes first, then continue play with the person on the left being the next player.
- The player identifies the food on the card.

- If correct, the player gets to take the card.
✓ Tell what the food is whether the student does or does not get it correctly.
 - If the player is wrong, the card goes to the bottom of the deck.
 - Any questions about the card should be addressed to the expert whose name or initial is on the front.
✓ Use the class portraits for identification of initials. See Activity K.1.15. MAKING FRIENDS.
 - Players take turns until all the cards are identified.
 - A new deck of cards can be drawn from the master set when all the foods in the original set are known.
-

EXTENSIONS

- Put the Food Card Game in an activity center.
- Have the students expand the list of foods in their ABC Book of Foods and make new food cards for the game whenever they learn about new foods.



K.5.5 FAVORITE FOODS

OBJECTIVES

The students

- identify foods they like and dislike
- compare their likes and dislikes with those of other students
- identify and test ways of learning to like other foods

BACKGROUND

FAVORITE FOODS is a member of the food series. Other activities in the series are K.3.12 ANIMALS AND FOOD, K.5.2 DRINKS, K.5.3 FLOUR AND BREAD, K.5.4 FAMILIAR FOODS, K.5.6 NEW FOODS, and K.5.7 SNACKS FROM THE GARDEN.

FAVORITE FOODS is also the second of three food activities designed to help students broaden their recognition of foods and increase the range of foods that they will eat. It usually follows K.5.4 FAMILIAR FOODS and precedes K.5.6 NEW FOODS. In FAVORITE FOODS the students use the ABC Book of Foods made in Activity K.5.4 FAMILIAR FOODS to find foods that they like and dislike. They then identify ways that they can broaden the range of foods they are willing to eat.

Broadening food acceptance

The students compare their likes and dislikes and talk about what causes some people to like the same food others dislike. From this the students work at ways of increasing their range of acceptance of foods they now may dislike or may not know about.

STUDENT ROLES

Food expert

Food consumer

MATERIALS

ABC Book of Foods from Activity K.5.4 FAMILIAR FOODS

Food Cards from Activity K.5.4 FAMILIAR FOODS

Student Pages K.5.5A FAVORITE FOODS

K.5.5B FOODS I'M TRYING TO LIKE

PRODUCT

Completed Student Pages

PROCEDURES

1. Discuss the students' ABC Book of Foods.

Ask such questions as these:

- Is there anyone here who has tasted all the foods that are in our ABC book about foods?
- Does anyone like all the foods that are in the ABC Book of Foods?
- Can anyone share why they like one of the foods that are listed? Why?
- Can anyone share why they don't like one of the foods listed? Why?

2. Help the students create picture or word lists of foods they like and dislike on Student Page K.5.5A FAVORITE FOODS.

Have them do the following:

- Copy the names or draw pictures of up to 5 foods they really like and are favorite foods. Use the Food Cards and the ABC Book of Foods as references.
- If they have foods that they dislike, copy the names of up to 5 foods they dislike, using the cards and the ABC Book of Foods.

3. Help the students work in groups to find students who have the same or similar likes and dislikes.

Ask such questions as these:

- Did anyone find two people who have exactly the same likes and dislikes?

- Did anyone find other people who have most of the same likes and dislikes?
- Why do you think some people have just about the same likes and dislikes?
✓ Get at such things as they might eat most of the same things at home or in the school lunch.

4. Help the students work in groups to find other students who have none or very few of the same likes and dislikes.

Ask such questions as these:

- Did anyone find someone who has completely different likes and dislikes?
- Did anyone find someone who has almost completely different likes and dislikes?
- Why do you think some people have such different likes and dislikes?
✓ Get at the such things as they may eat different things at home or they like the taste of different foods.

5. Have some of the students who like and dislike the same food tell why they like or dislike it.

6. Have the students discuss ways that they could learn to like more kinds of foods.

Help them include such things as these:

- Thinking about why other people like foods that they dislike themselves.
- Trying small pieces of food each time the food is available to get used to it.
- Using dressings, spices, or sauces to change the taste of the food.
- Saying to oneself, I think I can really like this food.
- Remembering that people need a wide variety of foods to keep their bodies moving, growing, and working right.

7. Encourage the students to try new foods and keep a record on Student Page K.5.5B FOODS I'M TRYING TO LIKE of how their likes change or stay the same from one sampling to the next.

EXTENSIONS

- Have the students make pictorial class graph of food likes and dislikes.
- Make a bulletin board display of foods the class likes best.



K.5.6 NEW FOODS

OBJECTIVES

the students

- invent new foods
- make and taste their new foods and report on their likes and dislikes
- make recipes for their invented foods
- make a class recipe book of new foods
- review ways of changing the taste of foods
- review ways of broadening their own acceptance of different foods

BACKGROUND

NEW FOODS is a member of the food series. Other activities in the series are K.3.12 ANIMALS AND FOOD, K.5.2 DRINKS, K.5.3 FLOUR AND BREAD, K.5.4 FAMILIAR FOODS, K.5.5 FAVORITE FOODS, and K.5.7 SNACKS FROM THE GARDEN.

NEW FOODS is also the last of three food activities designed to identify foods and broaden the students' food acceptance. It usually follows K.5.4 FAMILIAR FOODS and K.5.5 FAVORITE FOODS.

In NEW FOODS the students invent new foods they think they would like to eat. They then make, taste, and rate how well they like their new foods.

Liquid foods

Cold foods are easiest to use, and the students can invent both solid and liquid foods. For liquid food inventions, a blender can be used to emulsify foods in milk, juices, and water. Samples can be served in small cups.

Sandwiches

The invention of solid foods can be simplified by creating new covers for sandwiches using soft pretzels, bagels, new breads, or other pastries. The students can invent new spreads by mixing existing spreads or creating new ones with a blender. Other fillings can be made from combinations of ingredients. Cut sandwiches into squares about 1 in. on a side.

Labeling

Label all equipment and foods so the students can copy the labels to make recipes for their new foods.

Supplies

Food supplies can come from a collection of foods that are planned for or that are inspirationally raided from the refrigerator. The refrigerator becomes a new kind of Inventor's Box. If possible, ask families to donate specific items.

Caution: Some students may have food allergies. These allergies should be kept in mind as these students explore new foods.

STUDENT ROLE

Chef

MATERIALS

equipment as needed such as

- a blender
- containers
- aluminum foil
- waxed paper
- bowls
- butter knives
- medicine cups
- food handler's gloves
- aprons

newspapers

foods for liquid creations

foods for sandwich creations

ABC Book of Foods

Student Pages K.5.6A NEW FOOD INVENTIONS

K.5.6B NEW FOOD RECIPE

PRODUCTS

Additions to ABC Book of Foods

Class Book of Recipes for New Foods

New foods

Completed Student Pages

PROCEDURES

1. Discuss with the students how they can invent a new food.

Ask such questions as these:

- Has anyone ever invented their own new food?
- How did you invent your new food?
- What was it like?
- Did you like eating your invention?

2. Introduce and discuss with the students the idea of inventing their own new foods. It is suggested that the invention be limited to drinks or sandwiches unless you have several helping hands and considerable equipment.

Discuss the following:

- Sanitation procedures.
- What equipment is needed or available.
- What foods, if any, the students need to bring in.
- How much of each invention can be prepared in class.
- How big the samples will be.

3. Help student groups invent new foods and divide up their creations for tasting.

Be sure to include the following:

- Review sanitation practices and have the students do necessary washing.
- Establish procedures.
- Have small groups work together to invent new foods.
- Make up a name for each new food and make a label to identify it.

4. **Have all the students taste each creation and rate its taste on Student Page K.5.6A NEW FOOD INVENTIONS.**
5. **Have each group make a picture or word recipe for their group's new food on Student Page K.5.6B NEW FOOD RECIPE. Help the students assemble the pages into a class Book of Recipes for New Foods.**
6. **Review ways that students can work to accept new and different foods and those they don't presently like.**

Help them with such ideas as these:

- Concentrating on the things about the food that others like.
- Trying small pieces of the food each time that it is available.
- Using spices or sauces to change the taste of the food.
- Saying to oneself, I think I can really like this food.
- Remembering that people need a wide variety of foods to help their bodies move, grow, and work right.

EXTENSIONS

- Have the students take home their recipes and try them with their families.
- Have the students name their new foods and add them to the ABC Book of Foods.



K.5.7 SNACKS FROM THE GARDEN

OBJECTIVES

The students

- harvest foods from their garden
- prepare and eat snacks made from garden fruits and vegetables

BACKGROUND

SNACKS FROM THE GARDEN is the culminating food activity and is designed to accompany Activity K.4.6 GARDENING. Other activities in the series are K.3.12 ANIMALS AND FOOD, K.5.1 BEAN SPROUT SALAD, K.5.2 DRINKS, K.5.3 FLOUR AND BREAD, K.5.4 FAMILIAR FOODS, K.5.5 FAVORITE FOODS, and K.5.6 NEW FOODS.

In SNACKS FROM THE GARDEN the students prepare snacks from fruits and vegetables they have grown in their garden. The activity demonstrates that vegetables and fruits that the students have grown are like the fruits and vegetables they find in their supermarkets and that they could, if need be, grow their own food.

Possible snacks

The students can easily prepare salads and snack foods with dips.

Snack time

Snacks can be prepared as fruits and vegetables ripen. Dips and dressings can be kept in a refrigerator in anticipation of ripening. Similarly, it may be possible to keep fruits and vegetables in refrigerated for a special snack event.

When snacks are made may be an ideal time to thank custodians, administrators, parents, and any older students who have helped in the gardening by inviting them to share in the bounty. Augment harvested fruits and vegetables with purchases if necessary.

STUDENT ROLES

Chef
Cook
Food service worker
Home food preparer

MATERIALS

dressings
dips
seasonings
equipment as needed such as
 blender
 containers
 knives
 bowls
newspapers
waxed paper
paper plates and cups
napkins
plastic eating utensils
food handler's plastic gloves
dishpan
hand soap
paper towels
dishwashing soap
Student Page K.5.7 SNACKS

PRODUCTS

Snack foods
Completed Student Pages

PROCEDURES

1. **Discuss with the students the preparation of snacks from the food they will harvest from their garden.**

Discuss the following things:

- What fruits and vegetables they will have to prepare.
- When the fruits and vegetables will be ready to pick.

2. **Prepare a list of what is to be prepared. Help the students create a menu using Student Page K.5.7 SNACKS.**

Help them decide the following:

- What the snack will be.
 - How the snacks will be prepared.
 - Who is to prepare each kind of snack.
 - What sanitation procedures are needed.
3. **If parents, older students, or others are to be involved, have the students compose an invitation.**
 4. **Help in the preparation of snacks, emphasizing sanitation. Encourage the students to sample all snacks.**
 5. **Summarize the snacking.**

Ask such questions as these:

- How did you like the snacks you prepared?
- Did anyone find that some of the foods were prepared in new ways? Which ones?
- What was your favorite snack?
- How did you keep things clean at each step in the food preparation?
- What would your family have to do to grow and prepare its own food?
- Has anyone found a new way to make foods tasty? What is it?

EXTENSIONS

- Help the students make a bulletin board display showing each of the steps they have gone through in growing and getting snacks ready to eat, starting with planning the garden.
- Write a thank-you note to all who have helped in the project.



BEST SALAD
SP K.5.1

Name _____

Date _____

Kind of salad			

**SNACK DRINKS**
SP K.5.2

Name _____

Date _____

Recipe for _____ .

Things I need:

What to do:



**INGREDIENTS
AND TASTE
SP K.5.3**

Name _____

Date _____

			
Wheat flour			
Salt			
Sugar			
Cornmeal			
Oil			
Baking powder			
Cornbread batter			
Cornbread			
Cornbread with butter or margarine			
Cornbread with jelly			

**FOOD CARDS**
SP K.5.4

Name _____

Date _____

Expert:**Expert:****Expert:****Expert:**



**FAVORITE
FOODS
SP K.5.5A**

Name _____

Date _____

FOODS I LIKE	FOODS I DO NOT LIKE



**FOODS I'M
TRYING TO LIKE**
SP K.5.5B

Name _____

Date _____

Trial	Food I'm trying to like			
1				
2				
3				
4				
5				



**NEW FOOD
INVENTIONS
SP K.5.6A**

Name _____

Date _____

Name of food			



**NEW FOOD
RECIPE
SP K.5.6B**

Name _____

Date _____

Recipe for

Things I need:

What to do:



SNACKS
SP K.5.7

Name _____

Date _____

Garden Snack Menu



**KINDERGARTEN
CLUSTER 6**

Health and Safety

- | | |
|--------|--------------------------|
| K.6.1 | Growth Chart |
| K.6.2 | Tooth Chart |
| K.6.3 | Tooth Care |
| K.6.4 | Exercise |
| K.6.5 | Germ |
| K.6.6 | Washing Hands |
| K.6.7 | Bathrooms and Basins |
| K.6.8 | Aprons |
| K.6.9 | Fountains and Faucets |
| K.6.10 | Getting Sick |
| K.6.11 | Feeling Sick |
| K.6.12 | Going to the Doctor |
| K.6.13 | What Doctors Do |
| K.6.14 | Going to the Hospital |
| K.6.15 | Raincoats |
| K.6.16 | Testing Raincoats |
| K.6.17 | Wet and Cold |
| K.6.18 | Keeping Warm Indoors |
| K.6.19 | Keeping Cool Indoors |
| K.6.20 | Hand-and-Foot Protection |
| K.6.21 | Getting Lost |



K.6.1 GROWTH CHART

OBJECTIVES

The students

- measure and record their height and weight on their growth charts
- trace their hands and feet on their growth chart
- analyze growth data for trends
- graph height data

BACKGROUND

GROWTH CHART is designed to follow Activity K.10.8 LINEAR MEASUREMENT. Together, GROWTH CHART and K.6.2 TOOTH CHART begin a collection of body measurements and observations that are continued through DASH 6. This information is kept in the Science Record Book which is passed on from class to class, year to year.

In GROWTH CHART the students measure their height in inches and weight in pounds and make foot and hand tracings. Ideally, two measurements will be made, one in the first semester and another near the end of the school year.

Making measurements

Whenever possible, measurements should be made by the students. Weight measurements can be made with a bathroom scale or the school nurse's scale. Don't be concerned about recording the weight in kilograms. In later years the students can make the necessary conversion from pounds to kilograms. Likewise it is not necessary to record height in both centimeters and inches since conversion can be made in later years.

String graphs

Once heights have been measured, cut strings equal in length to the students' heights. Use string of different colors for fall and spring measurements. Crayon can be used to color strings. Masking tape with the students' name can be attached to one end, and a small weight such as a paper clip can be attached to the other end. When the strings are hung side by side, the range of heights is very evident.

Area measurements

The students may need some help, particularly with tracing the outlines of their hands and feet. Tracing goes more easily if the fingers are held together in mitt fashion. The arm should be vertical to the paper so the heel of the hand can be traced. This activity presents an opportunity for older students to help the kindergartners.

If the students cannot count the squares to measure the area of their hand, leave the entry on the student page blank. This too can be completed in later years. When counting is possible, standardize area measurements by having the students count squares with a half or more coverage as whole squares. Don't count squares with less than half coverage. This will generally average out the area measurement.

STUDENT ROLES

Health worker
Nurse
Doctor

MATERIALS

Science Record Books
metric linear scale
string or yarn
crayon
masking tape
paper clips
bathroom scales
Student Pages K.6.1A GROWTH CHART
K.6.1B HAND AREA
K.6.1C FOOT AREA

PRODUCTS

String graph of heights
Completed Student Pages

PROCEDURES

1. In the fall of the year have the students record their height and weight on Student Page K.6.1A GROWTH CHART. Keep these records in the students' Science Record Books.

- At this time measurements will go into the growth chart as numbers. Interpretation and conceptual meaning of the numbers will come later, starting when the spring measurements are interpreted.
 - This is an ideal time to get older students to help kindergartners learn the measuring and recording processes.
 - ✓ If older students join in the activity, ask them to bring their own growth charts for comparison.
2. **Help the students use Student Pages K.6.1B and C to trace their hands and feet. It is not important to record area at this time.**
 3. **Make a string graph on the wall of students' heights. Use a labeled string for each student.**
 4. **Help the students record their heights and weights and trace feet and hands again in late spring.**
 - Add height measurements to the string graph made in the fall. Again use separate strings for each student.
 - Record the area in number of grid squares covered.
 - ✓ If the students are not assisted by older students or if they cannot count squares, don't be concerned. Counting can be done in subsequent years. The important thing is the tracings of hands and feet.
 - ✓ To standardize measurements, count squares with a half or more as whole squares. Don't count squares with less than a half. This will generally give an average hand area measurement.
 5. **Summarize the changes in measurement.**

Ask such questions as these:

- Who has grown since your height was measured last time?
- Who has stayed the same since your height was measured last time?
- How much have you grown in height?
- Has anyone grown shorter since last you measured height?
 - ✓ If there is a show of hands, ask what could have happened. Often the idea of incorrect measurements will spontaneously arise.

- Has anyone other measurements that have gotten larger?
 - ✓ Don't compare weights since even in kindergarten some students may be sensitive about weight.
 - ✓ Repeat the same kinds of questions for area measurements as were used in discussing height changes.
 - ✓ If the students cannot count the squares, a visual comparison will be sufficient.
-

EXTENSION

- Compare foot sizes by comparing shoes.



K.6.2 TOOTH CHART

OBJECTIVES

The students

- keep a record of the number of teeth they have
- keep a record of the number of cavities they have
- keep a record of the number of lost teeth they have

BACKGROUND

TOOTH CHART and Activity K.6.1 GROWTH CHART are revisited each year *DASH* K-6. TOOTH CHART gives an ongoing log of tooth loss and the appearance of new teeth, cavities, and fillings. The two activities are usually done at the same time. By keeping such longitudinal records the students get a sense of their natural biological growth and change.

Number of teeth

At this point in their development most students will have all their deciduous teeth (primary, milk, or baby teeth). The normal deciduous tooth count is 20, 10 below and 10 above. Molars are not part of the deciduous set. A few kindergarten students may have already lost teeth.

Counting teeth

The students count teeth using their tongue or finger. It may be easiest to count from the middle incisor back to the last premolar (half of the jaw at a time). Since the students' counting skills may be minimal, this is an ideal time for home involvement. Some parents will not know the number of teeth in a deciduous set.

The names of teeth need not be introduced at this point though their names are listed in the extension. Nomenclature will be discussed extensively in *DASH* 1.

STUDENT ROLE

Dentist

MATERIALS

mirrors

Student Page K.6.2 TOOTH CHART

PRODUCT

Completed Student Pages

PROCEDURES

1. **Discuss the idea with the students that for the next six years they will be keeping records of what happens to their teeth.**

Ask such questions as these:

- How many teeth do you think you have now?
✓ Most students will have their full set of 20 primary or deciduous teeth at the start of kindergarten, but will have no idea of how many they have.
- How could you find out?
- Can you feel your teeth with your tongue?
- Has anybody lost a tooth?
- Which tooth did you lose?

2. **Demonstrate to students how to count their teeth.**

Have them complete the tooth chart by

- Blacking in any gaps where teeth are missing.
- Circling the corresponding picture of each new tooth.
- Putting an X on any teeth that have cavities, fillings, or caps.

3. **Have the students verify each other's observations. Mirrors may be used.**

4. **Summarize the activity with the class.**

Ask such questions as these:

- How many teeth did you count in the top of your mouth?

✓ Most student will have their full compliment of 10 primary or deciduous teeth.

- How many teeth did you count in the bottom of your mouth?
- ✓ Most student will have their full set of 10 primary or deciduous teeth.
- How many of you have cavities or caps?
- How many of you have missing teeth?
- How many of you have a loose tooth?
- What do you think will happen to that loose tooth?

5. As the students lose teeth, have them record the occasion on the Learning Calendar and Student Page K.6.2 TOOTH CHART with the date.

EXTENSIONS

- Post a picture of a typical set of teeth with the names of the teeth labeled. The diagram on Student Page K.6.2 TOOTH CHART can be used.

Temporary (baby, milk, or deciduous) teeth number 20.

- 8 incisors
- 4 canines
- 8 premolars

Permanent (adult) teeth number 28-32.

- 8 incisors
- 4 canines
- 8 premolars
- 8-12 molars



K.6.3 TOOTH CARE

OBJECTIVES

The students

- identify the steps in proper tooth care
- demonstrate proper tooth care

BACKGROUND

This activity usually follows Activity K.6.2 TOOTH CHART. After having recorded the condition of their teeth, the students are introduced to good oral hygiene. This is an excellent opportunity for a presentation by a dental hygienist, a dentist, or the school nurse.

Note home

Send a note home asking that the students be given a toothbrush to bring to school.

Demonstration

If possible demonstrate proper tooth hygiene with a large model set of teeth and a toothbrush. If the school has the necessary facilities have the students brush their teeth regularly after school meals.

STUDENT ROLES

Dental hygienist

Dentist

MATERIALS

large model of teeth

large model of a toothbrush

dental floss

facial tissue

student toothbrushes (if possible)

toothpaste

"Tooth Brushing Rhyme"

Student Page K.6.3 TOOTH BRUSHING CHART

PRODUCT

Completed Student Pages

PROCEDURES

1. **Before lunch or a snack, ask the students not to brush their teeth until after the lesson. Have them examine their teeth after eating.**

Have them do the following:

- Rub their tongue over their teeth.
- Describe what they feel.
- Wipe half of their teeth with a facial tissue.
- Again rub their tongue over their teeth.
- Describe how their wiped teeth feel compared to their unwiped teeth.
- Suggest what they think was on their teeth.
✓ Work toward the idea of bits of food.
- Suggest other ways of getting rid of this food deposit.
✓ Work to the idea of tooth brushing.

2. **Discuss the importance of brushing teeth shortly after eating when possible. Then demonstrate tooth brushing and flossing using a large model of the teeth and a toothbrush.**

Show the students how to

- Use up-and-down strokes of the brush on the inside and outside the teeth.
- Use back-and-forth strokes across the tops of the teeth.
- Floss between the teeth.

- 3 Have the students use their own toothbrush to practice brushing. Have them practice flossing their teeth. Where arrangements can be made, include tooth brushing after lunch as a common practice.
4. Introduce the "Tooth Brushing Rhyme" to the students.

**TOOTH BRUSHING
Rhyme**

Brush twenty times up,
And twenty times down,
Inside, outside, all around.
Then floss between
To complete the routine.

5. Send Student Page K.6.3 TOOTH BRUSHING CHART home to be used as a tooth brushing reminder.

For several days following and periodically thereafter, ask the students the students such questions as these:

- How many brushed your teeth this morning?
- How many made a check on your tooth brushing chart?
- How many brushed your teeth last night?
- How many made a check on your tooth brushing chart?

EXTENSION

- Periodically have the students report on their tooth brushing.



K.6.4 EXERCISE

OBJECTIVES

The students

- explore the role of exercise in staying fit
- relate the role of practice to learning something new

BACKGROUND

The Focus Book *The Kitten With The Black Spot* introduces the importance of exercise and practice in making the body strong, agile, and fit. EXERCISE can be used any time after class routines have been established.

Logic of the Activity

There are several messages in the story. These include the need for exercise, the need to practice what one learns, and the need to understanding the feeling of being left out. It is best to discuss only one of these ideas each time the book is read.

Exercise

Emphasize the function of exercise in developing muscle size, strength, and endurance. Help the students understand that some individuals can become stronger than others, but that all will get stronger by exercising.

Practice

Get at the universal need to practice what we learn in order to master and make things learned part of our lives. This is particularly true when we are learning how to control and develop our bodies. Have the students make a class chart about things that must be practiced to learn.

Loneliness

Open a discussion about loneliness. This may be a time to get the class to look at how people can be isolated even in a classroom. Have the students reflect on how they can include everyone in class activities.

STUDENT ROLES

Actor
Educator
Exercise councilor

MATERIALS

Focus Book *The Kitten With The Black Spot*
Student Page K.6.4 EXERCISE

PRODUCTS

A drama
Chart about things that must be practiced to learn
Completed Student Pages

PROCEDURES

1. **Read the Focus Book *The Kitten With The Black Spot*. Have the students act out the story.**
2. **Discuss the story with the class.**

Ask such questions as these:

- How did the kittens get into good physical shape?
- What kind of movements are natural for a kitten? A cat?
- How do students get into good physical shape?
- What kinds of movements are natural for kindergartners? Younger children? Older children? Adults?
- What kitten movement did you like best?

3. **Discuss what happens when people don't exercise regularly.**

Ask such questions as these:

- What is the kitten's job to be?
- What are your jobs? At school? At home?

- What other jobs could you do?
- What might happen to the kitten with the black spot if it just kept on eating, sitting, watching, resting, and sleeping instead of playing and working?
- What might happen to you if you sat and watched television all day long?
- What kinds of activities do you do to get into good physical shape?
 - ✓ Get at such things as playing outdoors, playing sports, helping clean the house or yard, tending a garden, and so forth.
- What kinds of things can you do that will help you stay in good shape?
 - ✓ Have the students use Student Page K.6.4 EXERCISE to draw ways they exercise.

4. Have the students role-play being out of shape.

5. Discuss how children feel about being the last one left like the kitten with the black spot.

Ask such questions as these:

- What did the kitten with the black spot do while the other kittens played?
- Why do you think the kitten with the black spot did not play with the other kittens?
- How do you think the kitten felt about being the last one chosen for a new home?
- How does it feel to be part of a group of people? How does it feel to be all by yourself when others are playing or working together?
- Do you ever like to be alone? When?

6. Discuss the differences between natural and learned movements by kittens.

Ask such questions as these:

- What can a kittens all do?
- Which movements were *learned* by the kittens?

- Who taught the kittens?
- What body movements can you remember learning?
✓ Get at such things as catching a ball, cutting with scissors, using a pencil, and so forth.
- Who teaches children?
✓ Work to the idea of parents, family, friends, other students, teachers.

7. Discuss the importance of effort and practice in learning. Point out that it is all right not to know everything and that it takes time to learn something new.

Ask such questions as these:

- What did the kitten practice? Why?
- What kinds of things are you learning to do now?
- Do you need to practice them? Why?

EXTENSION

- Have the students continue the story telling what happened to the kitten with the black spot when it went with the man.



K.6.5 GERMS

OBJECTIVES

The students

- perform movements described in a rhyme about germs
- discuss the idea of germs getting into the body
- create a model of a germ

BACKGROUND

This activity is the first in a seven-year sequence of activities that investigate disease and sanitation. GERMS should be done fairly early in the year because so many other activities can build on it. It is designed as a companion to K.6.6 WASHING HANDS and to be followed by K.6.7 BATHROOMS AND BASINS. Other series using GERMS as a background are the animal care activities K.3.3 CARING FOR CLASSROOM ANIMALS and K.3.15 ANIMAL WASTE, food activities K.5.1-K.5.7, and the disease-and-sickness activities K.6.10-K.6.14.

The term germ

Because of both its common and technical usage, the word *germ* has been selected to be descriptive of a wide variety of microorganisms that cause disease. Germs include virus, bacteria, mold, and protozoa.

Conceptualizing germs

Germs are not visible to the unaided human eye and are usually not meaningful to a child even when they are viewed through a microscope. Therefore, a rhyme and simulation are used to introduce germs to kindergartners and providing a way to start conceptualization.

Rhyme

The first part of the rhyme is presented as a dramatic reading with role-playing. It introduces the idea of germs and their association with disease.

The second activity, K.6.6 WASHING HANDS, is done as a simulated investigation. Through inquiry the students find that both soap and water are necessary in hand washing to get rid of *germy goo*.

STUDENT ROLES

Actor
Doctor

MATERIALS

Part 1 of the "Germy Goo" rhyme
paper lunch bags
old socks
colored markers
yarn
buttons
Student Page K.6.5 Germ

Product

Completed Student Pages

PROCEDURES

1. **Read Part 1 of the "Germy Goo" rhyme to the class and have the students make germ puppets out of bags or socks to act out the rhyme.**
 - Ask the students to tell what the germ looks like.
 - Give the students an Inventor's Box with items to make and decorate their puppets.
 - ✓ If puppets have not been made before, it may be necessary to demonstrate some construction ideas.
2. **Read Part 1 of the "Germy Goo" rhyme again and have the students role-play Germy Goo with their puppets. They can do pantomimes and create sound effects to dramatize the actions of a germ.**
3. **Discuss the "Germy Goo" rhyme with the students.**

Ask such questions as these:

 - How do germs get into your bodies?
 - What do germs do in your bodies?

- How do you know germs are all around you?
✓ Work to such things as doctors tell us, people can see them through microscopes, germs are shown on TV.
 - Can you see germs?
✓ Work to the idea that if we had a very powerful microscopes, we could see them.
 - What can you do to stop germs from getting into your bodies?
✓ This is the lead into Part 2 of the rhyme.
4. **Have the students draw their idea of a germ. Have them use Student Page K.6.5 GERM.**
-

EXTENSION

- Have the students make a chart of places where they think they would find lots of germs and places where they would find few germs.

RHYME**GERMY GOO
(Part 1)**

There once was a terrible germ,
 Who was long and looked like a worm.
 His favorite trick
 Was to get people sick,
 So they'd lie on their back and squirm.

Oh, Germ was too tiny to see,
 He could hide in dirt or a tree.
 But he liked to wait,
 Til he could get onto a plate,
 Then he'd shake all his bristles with glee.

Oh, Germ was a smart little guy.
 From the plate he'd jump into the pie.
 Then he would ride,
 All the way inside,
 With the milk and chicken nearby.

Oh, Germ was vicious and mean.
 He'd eat away at stomach and spleen,
 And poison he'd drip,
 From front to tip,
 And all of the bristles between.

Oh, Germ made bones start to creak.
 He'd send fever up to its peak,
 But bodies do grow
 Used to this show
 And put a STOP to that Germ in a week.

Now there is a secret to hear.
 And I'll whisper it into your ear.
 By it I mean
 That if you keep things clean,
 No germ will ever appear.



K.6.6 WASHING HANDS

OBJECTIVES

The students

- perform a simple investigation to see how germs might be transmitted
- conclude that both soap and water are needed to get "goo" off their hands
- discuss the results of the investigations

BACKGROUND

WASHING HANDS is the second activity in the disease-and-sanitation series. It is designed to follow Activity K.6.5 GERMS and precede K.6.7 BATHROOMS AND BASINS. Other series using GERMS as a background are the animal care Activities K.3.3 CARING FOR CLASSROOM ANIMALS and K.3.15 ANIMAL WASTE and the disease-and-sickness Activities K.6.10–K.6.14.

WASHING HANDS continues the rhyme begun in GERMS and leads the students through an investigation of how disease can be transmitted when hands are not washed.

Logic of the activity

Through this investigation the students discover that water alone does not remove oily dirt and that soap is an essential part of hand washing. This is a visual verification that washing our hands with soap does remove dirt and is one way to stop germs from getting into our bodies.

Germmy Goo

Germmy Goo can be made from any edible material that is dark enough to mask the presence of cooking oil. A suggested recipe for a class of 24 students is set out below.

- 2 Tablespoons *unsweetened* cocoa or chocolate
- 2-3 Tablespoons cooking oil
- 1/4 packet unflavored gelatin
- 1/4 cup of hot water

Blend so that the mixture stays suspended when cold. Place portions in shallow cups so the students can dip their fingers into the goo. Use unsweetened chocolate so that the ingredients are bitter.

Simulated bread

To simulate pieces of bread, cut 8 1/2 x 11-in. sheets white paper into quarter pieces. Oil is normally obvious on the sheet after hands are rubbed with a towel or are washed with water alone. Where the oil touches the paper it will look transparent. Test the goo to ensure that there is enough oil to be apparent when the fingers are washed with water alone. Add more oil to the mix if necessary.

STUDENT ROLE

Researcher

MATERIALS

Part 2 of the "Germy Goo" rhyme
 8 1/2 X 11 white paper cut into fourths to simulate bread
 scissors
 small cups to hold Germy Goo
 1 cup per 4-6 students Germy Goo
 unsweetened chocolate
 cooking oil
 unflavored gelatin
 hot water
 measuring cups and spoons
 dishpans (1 per 4-6 students) for washing off the Germy Goo
 soap
 paper towels
 water to wash hands
 Student Page K.6.6 WASHING HANDS

PRODUCTS

Clean hands
 Completed Student Pages

PROCEDURES

1. **Have student groups prepare for the investigation. Have them cover their work area with newspaper if needed.**

Give each group the following things:

- Germy Goo in small cups.
- Paper towels.
- Three small pieces of paper simulated bread per student in group.
- Dishpan with water.
✓ No soap yet.

2. **Read the Part 2 of the Germy Goo rhyme and have the students perform the investigation.**

- Have the students follow the directions given in the rhyme.
- Distribute soap only when the rhyme calls for it.
- Have the students clean up.

3. **Reread the rhyme and discuss the investigation.**

Ask such questions as these:

- How is washing with water *only* like washing with soap and water? How is it different?
- Why should you use soap when you wash?
- Why should you wash your hands before you prepare food?
✓ Get at the possibility of getting germs into food.
- Why should you wash your hands before eating?
✓ Get at keeping germs from getting into food.

4. **Have the students think of ways they clean their hands their hands at home and on trips.**

Ask such questions as these:

- Where are the places that have basins or sinks to wash hands?
Soap?

- How do you use a soap dispenser?
 - Are there other ways to clean our hands when you don't have soap and water?
 - ✓ Get at such things as using individual hand-washing packets of wipes.
5. **Have the students cut out the pictures from Student Page K.6.6 GERMY GOO and arrange them in the order they carried out the investigation.**
-

EXTENSION

- Have the students survey the school for places where they can wash their hands.

Part 2 GERMY GOO**RESPONSES**

Now here is a problem or two.
Your fingers get covered with goo.
Way down in the back,
Waiting to attack,
A germ wants to get into you.

*Have the students dip
their fingers in the
"goo."*

Now pick up a slice of bread.
Would you want to go right ahead,
And gulp it all down?
But what have you found?
Could old Germ get into you an be fed?

*Have the students pick
up a piece of "bread"
and inspect it.*

Answer: Yes

Oh what, oh what do you do,
To get rid of the Germ and the goo?
Now what did we say,
Was really the way,
To keep old Germ away from you?

*Answer: Wash your
hands.*

What will get off the stuff?
Water and a towel that's rough?
Sounds good to me,
So try it and see.
But really is that enough?

*Have the students use
water and toweling and
get another piece of bread.*

*Answer: No
Soap is needed*

hands.

You need to add soap you say,
To clean all of the oil away?
Try that out, too.
Did you get all the goo?
Now that's how to make a secret pay.

*Have the students use
water, and soap and
towels.
Then try the bread test.
Answer: Yes.*

Now the point of the story we've told,
Its that germs are tricky and bold.
Washing before we eat,
Dooms their attack to defeat.
Soap and water stop germs cold.



K.6.7 BATHROOMS AND BASINS

OBJECTIVES

The students

- learn about using bathroom facilities properly
- learn about keeping the bathroom clean
- learn about conserving water and paper

BACKGROUND

Many daily routines are based on human rhythms and body signals. This activity focuses on our biological needs and the body signals related to elimination. This activity usually follows Activities K.6.5 GERMS, K.6.6 WASHING HANDS and K.3.15 ANIMAL WASTE. It concerns sanitary practices associated with elimination—urination and defecation.

Focus Book

The Focus Book *WHEN I HAVE TO GO* is used to review the routines involved in using the bathroom. Emphasize that following these routines is a sign of growing up and becoming independent. The Focus Book provides a way to introduce ideas that are often difficult to raise in the normal operation of the classroom.

STUDENT ROLE

Hygienist

MATERIALS

Focus Book *When I Have To Go*
 poster paper
 colored markers
 tape
 Student Page K.6.7 BATHROOM POSTER

PRODUCTS

Posters
Completed Student Pages

PROCEDURES

1. **Read the Focus Book *When I Have To Go*.**
2. **Use the alternate version and read the story a second time.**

Have the students do the following:

- Describe the routine of going to the bathroom at school.
- Discuss the similarities and differences in the routines followed by boys and by girls.
 - ✓ Get at such things as sitting and standing positions, raising the toilet seat and restoring it, and so forth.
- Discuss flushing toilets and urinals and washing hands with soap and water to prevent the spread of germs.

3. **Discuss the story with the students.**

Ask such questions as these:

- In getting rid of body waste, feces and urine, how are you like babies? How are you different?
 - ✓ Get at such things as they are like babies because they both eliminate feces and urine. They are different since babies wear diapers and they now use the toilet.
- Why do you need to go to the bathroom?
 - ✓ Get at the idea that urination and defecation are natural body processes that get rid of things the body cannot use.
- How does your body tell us when it is time to go to the bathroom? What are body signals?
 - ✓ Get at the idea that there is usually a sensation of pressure.
- Why is it important to wipe yourselves carefully? Flush toilets with the paper you use in wiping? Wash your hands with soap and water?
 - ✓ Get at the need to remove waste of all sorts that may carry germs.

- What do you do when caring for animals that is like using the bathroom?
✓ Get at such things as removing feces and urine and washing of hands.
- Why do some children laugh about going to the bathroom?
✓ Get at the idea that many people are embarrassed about using the toilet because this is done privately and seldom talked about.

4. Discuss sanitation in terms of clean bodies and clean facilities.

Include such things as these:

- Flushing toilets.
- Wiping toilet seats if wet.
- Wiping oneself carefully and disposing of toilet tissue properly.
- Washing hands with soap and water.
- Keeping basins clean.
- Picking paper off the floor and putting it in waste containers.
- Using paper towels to wipe hands and excess water around basin.
- Disposing of paper towels in a wastebasket.

5. Have the students suggest ways of conserving water and paper.

6. Have the students make posters to act as reminders of good bathroom habits. Have them use student Page K.6.7 BATHROOM POSTER.

7. Discuss the way the body signals people to take care of their basic biological needs.

Include the following:

- How they feel when they need to breathe, eat, drink, exercise, rest, and eliminate waste products.
✓ Have the students describe the way the body signals when these needs must be satisfied.

- Similarities between humans biological needs and those of other animals.
- 8. Name the body parts related to eliminating waste products when doing activities dealing with animal pets and their functions. See Activity K.3.15 ANIMAL WASTE.**
-

EXTENSIONS

- Read trade books dealing with elimination. See the *DASH Book List*.
- Have the students put their posters in their bathrooms.



K.6.8 APRONS

OBJECTIVES

The students

- invent plastic aprons
- use their plastic aprons
- discuss safe use of plastic bags

BACKGROUND

APRONS is designed to be a companion to Activity K.6.15 RAINCOATS and is part of a series that deals with the basic biological need of body protection. It usually precedes K.3.3 CARING FOR CLASSROOM PETS and K.3.15 ANIMAL WASTES. APRONS is often introduced when students have a project such as caring for pets or easel painting in which clothes need to be protected.

Safety and plastic bags

APRONS provides an opportunity to discuss the safe use of plastic bags since these are the suggested construction material. The following aphorism may help bring home the point.

Plastic Bag Aphorism

Put a plastic bag
Over your head.
And your risking
Being dead.

Cleaning and storage

Aprons should be cleaned and stored after use. They can be kept in a resealable or drawstring plastic bag with the student's name or initials on them.

STUDENT ROLES

Inventor
Safety engineer

MATERIALS

permanent markers
plastic garbage bags
resealable plastic bags
scissors
string
masking or plastic tape
Student Page K.6.8 APRONS

PRODUCTS

Aprons
Completed Student Pages

PROCEDURES

1. **Introduce the problem of inventing some kind of clothing protection when the students are about to engage in an activity that may soil clothing.**

Ask such questions as these:

- What is likely to happen to your clothes when you paint, cook, clean animals, work with soil, and so forth?
- How could you protect your clothes?
- What kind of materials could you use to make aprons?

2. **Have the students invent their aprons. Direct the students to the INVENTOR'S BOX containing plastic bags and other materials. Discuss plastic bag-safety before they begin.**
3. **Have the students identify their aprons with permanent markers and make a storage container.**

4. **Have the students show their aprons to the class and tell about the advantages of their own inventions.**
 5. **Have the students use Student Page K.6.8 APRONS to record ways they use their aprons.**
-

EXTENSIONS

- Have the students decorate their aprons with permanent colored markers and other materials to identify and individualize them.
- Have the students draw a picture of their apron and show its dimensions in number of paper clips, centimeters, inches, or other units.



K.6.9 FOUNTAINS AND FAUCETS

OBJECTIVES

The students

- learn about using water facilities correctly
- learn about keeping facilities clean
- learn how to report leaks and conserve water

BACKGROUND

FOUNTAINS AND FAUCETS emphasizes safety, sanitation, and conservation of water. It usually follows Activities K.6.5 BATHROOMS AND BASINS and K.6.6 WASHING HANDS. An associated activity is K.8.4 TURNING THINGS OFF. The students should know where to find water that is safe for drinking and how to drink it safely.

Demonstration

A demonstration format is used in this activity during an on-campus field trip to locate facilities. The use of each kind of faucet or drinking fountain should be discussed and any problems should be identified during the visit to each site.

Social interaction

Taking turns, forming lines, and drinking quickly are simple but important skills that can be used as models in other situations.

STUDENT ROLES

Health worker
Safety engineer

MATERIALS

Poster paper
Markers, paint, or crayons
Student Page K.6.9 FOUNTAINS AND FAUCETS POSTER

PRODUCTS

Signs about fountains and faucets
Completed Student Pages

PROCEDURES

1. **Explain to the students that they will be going on a trip around the school to see which faucets can be used for drinking and which are used for other purposes.**
 - Have the students make signs to tell which faucets and fountains can be used for drinking and which are for washing hands.
2. **Take the class on a walk around the school to explore the water facilities.**
 - Have the students point out sites where they can drink water and where they can wash their hands.
 - Post signs on fountains used for drinking.
 - Post signs on faucets used for hand washing.
 - Discuss what the signs mean and which faucets or fountains are not to be used for drinking.
 - Discuss the rule that even if a sign is gone, they should not drink water from a faucet or fountain they have posted as not to be used for drinking.
 - If water is drunk from a faucet rather than a fountain, show the students how to cup their hands to hold and drink water.
✓ Emphasize the need for washing their hands before using them as a cup for drinking water.
3. **Discuss safety and sanitation when using fountains and faucets.**

Ask such questions as these:

- Why it is important to keep fountains and faucets clean?
- Why should you *not* put your mouth directly on a fountain or faucet?

- Why should fountains not be used to wash hands?
- Why are basins and sinks more appropriate for washing hands?
- Why should soap be handy and be used in washing hands?
- Why should you use a minimal amount of water when you wash your hands?
- Why should you report leaky faucets and fountains?
- To whom should you report leaks?
- Why should you turn off water when it is not in use?

4. Discuss polite and safe behavior when using a drinking fountain.

Ask such questions as these:

- Why should you take turns at the drinking fountain?
- Why should you form a line when waiting?
- Why should you try to get a drink *before* the end of recess?
- What should you do when it gets slippery around a drinking fountain?
- Why should you not play with a drinking fountain?
 - ✓ Get at the safety problem of wet slippery surfaces and getting wet in winter.
 - ✓ Get at the sanitation problems of contaminating the water if you put your hands on the opening of the faucet or fountain.
 - ✓ Get at courtesy problems of being unfair to others who may want to use a fountain or faucet.

5. Have the students create posters about using fountains and faucets. Display the posters near the ones they use. Have them use Student Page K.6.9 FOUNTAINS AND FAUCETS POSTER.

EXTENSION

- Have the students setup a faucet patrol to check that faucets are off at the end of the day.



K.6.10 GETTING SICK

OBJECTIVES

The students

- identify the mouth and nose as places for germs to enter their bodies
- identify coughing, sneezing, and nose-blowing as ways of spreading germs.

BACKGROUND

GETTING SICK is the first of five activities about sickness and medical treatment. It is usually preceded by K.6.5 GERMS and K.6.6 WASHING HANDS and followed by K.6.11 FEELING SICK, K.6.12 GOING TO THE DOCTOR, K.6.13 WHAT DOCTORS DO, and K.6.14 GOING TO THE HOSPITAL.

Logic of the activity

In GETTING SICK the students do a simulation to show how something invisible can be passed from person to person. Because the idea of an invisible germ is difficult for the young student to conceptualize, simulation is used for them to see how germs can be transmitted. Ideally, the activity will be done at the beginning of the cold and flu season.

Simulation

In the first part of the simulation, the students choose a piece of white or colored paper that the teacher has secretly marked with chalk of the same color as the paper. The same color of paper should be used for all samples so that chalk that smears on other pieces does not show. Chalk should be put on the underside of the paper. The students are asked how they got their hands dirty and discover the almost invisible chalk on the paper.

In the second part of the simulation the students act out two playlets about passing germs. If the students are not ready for acting, they can use hand puppets.

STUDENT ROLES

Health researcher
Actor
Playwright

MATERIALS

colored or white chalk
colored or white construction paper
hand puppets
Student Page K.6.10 WHERE ARE THE GERMS?

PRODUCTS

Simulations and playlets
Completed Student Pages

PROCEDURES

1. **Have the students select a piece of paper from a pile of chalked paper. Have the students look at their hands.**

Ask questions such as these:

- Who found something on their hands?
- Why did you select dirty paper?
✓ Work toward the idea that it was difficult to see the *dirt*.
- What did you find out about the size of germs in the "Germy Goo" rhyme ?
✓ Work toward the answer that germs are very tiny and can hide in dirt and other places.
- How was the chalk like germs?
✓ Get at the idea that it was hidden.
- Why do you wash your hands?
✓ Have the students wash the chalk off their hands with soap.

2. Have the students act out the first playlet.

Jill has a miserable cold. She drinks a glass of water because she feels very hot and thirsty and leaves the glass on the sink counter. Her brother Bill comes home from school. He sees the glass on the counter, and uses it to get a drink.

Ask such questions as these:

- Who can predict what might happen to Bill?
✓ Work toward that he might get a cold.
- Why might he get a cold?
- How could he get cold germs?
- How was the chalk on the paper like the germs on the glass?
- What could Jill have done to help prevent Bill from getting a cold?
✓ Get at such ideas as washing the glass, putting it in the dishwasher, and so forth.
- What could Bill have done to keep from getting a cold?
✓ Get at such things as getting a clean glass, washing the used one before drinking from it, and so forth.

3. Have the students act out the second playlet.

Bill goes to school, later in the week and halfway through the morning he starts to sneeze and cough. Twice he sneezes in the face of his friend Jack.

Ask such questions as these:

- Who can suggest what might happen to Jack?
✓ Work toward the idea that he might *get a cold*.
- Why might he get a cold?
- How could he get the germs?

- How was chalk on the paper like the germs in the sneeze?
✓ Blow some of the chalk dust of the paper into the air.
 - What should you do when you sneeze?
✓ This is the time to discuss covering one's mouth and nose when sneezing, preferably with a tissue or a handkerchief.
4. **Building on what happens to Jack, have the students continue the playlets about the transmission colds.**

Ask such questions as these:

- How are germs passed on from one person to another?
 - What do germs do to you?
✓ Work to the idea that they may make you sick, and the person who is sick is said to have a *disease*.
 - How are disease-causing germs like the chalk?
 - What should you do to prevent passing disease germs to someone else?
 - What does it feel like when you get a cold?
5. **Have the students complete Student Page K.6.10 WHERE ARE THE GERMS?**

EXTENSION

- Exchange the students' playlets about colds with other classes. Their work can be videotaped so they can see themselves as actors or puppeteers.



K.6.11 FEELING SICK

OBJECTIVES

The students

- discuss symptoms of sickness
- share their experiences of feeling sick
- identify times when one should stay home because of sickness

BACKGROUND

FEELING SICK is part of a series about getting sick and medical treatment. It usually follows Activities K.6.5 GERMS, K.6.6 WASHING HANDS, and K.6.10 GETTING SICK and precedes K.6.12 GOING TO THE DOCTOR, K.6.13 WHAT DOCTORS DO, and K.6.14 GOING TO THE HOSPITAL.

Focus Book

Use the Focus Book *I Think I Feel Sick* to encourage students to share their experiences of feeling sick and how it was decided whether they should go to school.

School policy

This is an ideal time to discuss any school policies on sickness and staying home. It is also a good time to send home any communications concerning school policy on sickness.

STUDENT ROLE

Patient

MATERIALS

Focus Book *I Think I Feel Sick*
Student Page K.6.11 FEELING SICK

PRODUCT

Completed Student Pages

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PROCEDURES

1. Read the Focus Book *I Think I Feel Sick*.

Ask such questions as these:

- How did the girl feel when she woke up?
- Why did she think she might be sick?
- Why did she want to go to school?
- Have any of you ever felt sick when you woke up in the morning?
- What did you feel like?
✓ There will be a wide range of accounts. Get as many as possible.
- Why did the girl think that maybe she could go to school?
- Do you think she might have felt better later? Why do you think so?
- Have you ever gone to school when you felt sick? What happened?
- What did the girl's mother say to her?
- How do you think the mother knew her daughter was sick?
- Why did the mother get a thermometer?
- What is a *normal* temperature?
✓ Work for about 98.6° F (37°C).
- Have you ever had a fever or a *temperature*? Do you remember what your temperature was?
- What would your temperature be if you had a fever?
✓ Work for about 99° F and above.
- Why did the mother say her daughter could not go to school?

- What might have happened to other children in the class if the girl had gone to school?
- What should you do when you think you feel sick?

2. Introduce Student Page K.6.11 FEELING SICK.

Have the students do the following:

- Complete the student page.
 - ✓ Pictures give students additional opportunities for expressing their experience and ideas.
 - Share and discuss their entries.
-

EXTENSION

- Have the students make a display of pictures showing how they feel when they think they might be sick.



K.6.12 GOING TO THE DOCTOR

OBJECTIVES

The students

- share their experiences in going to the doctor's office
- identify the instruments used in a doctor's office
- identify what doctors do in a checkup

BACKGROUND

GOING TO THE DOCTOR is one of five activities about getting sick and medical treatment. It usually follows K.6.10 GETTING SICK and K.6.11 FEELING SICK, and precedes Activities K.6.13 WHAT DOCTORS DO and K.6.14 GOING TO THE HOSPITAL.

Logic for the activity

In this activity the students suggest what they think the various procedures and instruments that the doctor uses are for. In Activity K.6.13 WHAT DOCTORS DO the students are taken through an examination and the instruments doctors use. Discussion of the Focus Book *Going To The Doctor* helps the students make reasonable hypotheses about the examination and fully understand the tension expressed by the character in the story. The emphasis is on sharing their own experiences as a way to reduce the tension that often accompanies a trip to the doctor.

STUDENT ROLES

Doctor
Patient

MATERIALS

chart paper
marking pens
Focus Book *Going to the Doctor*
Student Page K.6.12 A DOCTOR'S TOOLS

PRODUCTS

Chart about why doctors do what they do
Completed Student Pages

PROCEDURES**1. Read the Focus Book *Going to the Doctor* to the class.**

Ask such questions as these:

- Why did the boy have to go to see the doctor?
- What didn't he like about the doctor's office?
- Have any of you ever gone to a doctor's office? Did you have some of the same kinds of feelings as the boy in the story?
- What do you call the instrument the nurse used to weigh the boy?
- Why might the doctor want to know the boy's weight?
✓ Have the students suggest reasons. Record their ideas on a chart about why doctors do what they do.
- What do you call the instrument used to take his temperature?
- Why would the doctor want to know the boy's temperature?
✓ Have the students suggest reasons and record their ideas on a chart about why doctors do what they do.
- Does anyone know what the instrument used to look into his ear is called?
✓ Accept all suggestions. It is an *otoscope*.
- Why would the doctor want to look into the boy's ear?
✓ Have the students suggest reasons and record their ideas on a chart about why doctors do what they do.
- Does anyone know what the piece of wood used to push down the tongue is called?
✓ Accept all suggestions. It is a *tongue depressor*.
- Why would the doctor want to look at the boy's throat?
✓ Have the students suggest reasons and record their ideas on a chart about why doctors do what they do.

- Does anyone know what the instrument is called that the doctor uses to listen to the chest is called?
✓ Accept all suggestions. It is a *stethoscope*.
- Why would the doctor want to listen the boy's chest?
✓ Have the students suggest reasons and record their ideas on a chart about why doctors do what they do.
✓ Save the chart about why doctors do what they do to use in Activity K.6.13 WHAT DOCTORS DO.
- How did the boy feel after the doctor was finished examining him?

2. Introduce Student Page K.6.12 A DOCTOR'S TOOLS.

Have the students do the following:

- Complete the student page.
- Discuss what they have entered.

EXTENSIONS

- Have students who have recently gone to the doctor share what happened. Be cautious—some students may have had traumatic experiences.
- Start a list of doctor's tools using those on the student page. Add to the list as students describe them.



K.6.13 WHAT DOCTORS DO

OBJECTIVE

The students

- identify the function of some of the tools used by doctors to examine patients

BACKGROUND

WHAT DOCTORS DO is one of the series of activities on getting sick and medical treatment. It is designed to follow Activity K.6.12 GOING TO THE DOCTOR. Other activities in the series are K.6.10 GETTING SICK, K.6.11 FEELING SICK, and K.6.14 GOING TO THE HOSPITAL.

Focus Book

Through the Focus Book *What Doctors Do and Why They Do It*, the students are introduced to the logic of the doctor's examination. They then relate each of the instruments the doctor uses to its purpose in the examination and check to see how well they were able to anticipate the tool's functions in Activity K.6.12 GOING TO THE DOCTOR.

STUDENT ROLES

Doctor
Patient

MATERIALS

Focus Book *What Doctors Do and Why They Do It*
scissors
glue
chart about why doctors do what they do from Activity K.6.12 GOING TO THE DOCTOR
Student Page K.6.13 WHAT DOCTORS DO

PRODUCT

Completed Student Pages

PROCEDURES

1. Read the Focus Book *What Doctors Do and Why They Do It* to the class.

Ask such questions as these:

- Who in the story is sick?
- What instrument does the doctor use to weigh you?
- Why does the doctor weigh you?
✓ Sickness can be accompanied by loss of weight. During times of growth, gain in weight is usually an indication for kindergartners that the process is progressing properly.
- What instrument does the doctor use to take your temperature?
- Why does the doctor take your temperature?
✓ Many illness are accompanied by a fever. Temperature can be used as a measure of how bad a sickness is. Heat is evidence of your body fighting infection.
- What instrument does the doctor use to look into your ears?
✓ The otoscope.
- Why does the doctor look into your ears?
✓ Ear infections are very common. Redness in the ear may indicate an ear infection.
- What instrument does the doctor use to look into your throat?
- Why does the doctor use the tongue depressor?
✓ A tongue depressor is used so that the doctor does not have to touch the mouth and can press down the tongue to look into the throat and mouth. Often your tonsils, which are at the back of the mouth, will swell when you are sick.
- What instrument does the doctor use to listen to your chest?
✓ The stethoscope.
- Why does the doctor listen to your chest?
✓ When one has an infection in the chest, the chest sound is very different from when it is clear.

- How do the doctors use their fingers in diagnosis?
✓ They can feel swellings in any part of the body, particularly the abdomen, neck, in the groin, and armpits.
- How well did you anticipate the reasons for using different instruments in Activity K.6.12 GOING TO THE DOCTOR?
✓ Use the chart about why doctors do to check their reasoning.

2. Introduce Student Page K.6.13 WHAT DOCTORS DO.

Have the students do the following:

- Complete the student page.
- Discuss their entries.

EXTENSIONS

- When students go to the doctor, have them ask the doctor or nurse what they are doing and why. Have them report to the class.
- Ask a doctor or nurse to demonstrate use of some of their medical instruments.



K.6.14 GOING TO THE HOSPITAL

OBJECTIVES

The students

- identify things that happen when someone goes to the hospital
- share their experiences of going to the hospital
- make a bulletin board display about hospitals

BACKGROUND

GOING TO THE HOSPITAL is the last activity of the series about getting sick and medical treatment. Other activities in the series are K.6.10 GETTING SICK, K.6.11 FEELING SICK, K.6.12 GOING TO THE DOCTOR, and K.6.13 WHAT DOCTORS DO.

Logic for the activity

The intent of these activities is to help the students understand the place of medicine in their lives. Going to the hospital can be a very frightening experience for both children and adults. Understanding what is being done helps reduce some of the tension and helps the students to better contribute to their own recovery if they become patients.

Focus Book

The Focus Book *Going To The Hospital* takes the students into the hospital and introduces them to the people they may meet, the way they will be treated, and reasons they may need to go to the hospital. As in all of the books of the series *Going To The Hospital* is designed to take the mystery out of a potentially frightening situation. Ignorance can foster fear; knowledge can help allay fear.

STUDENT ROLES

Patient
Doctor

MATERIALS

Focus Book *Going To The Hospital*
 Student Page K.6.14 WHAT HOSPITALS DO FOR US

PRODUCT

Completed Student Pages

PROCEDURES**1. Read the Focus Book *Going To The Hospital*.**

Help the students discuss the story with such questions as these:

- Where does the story take place?
- Who are the characters in the story?
- Who goes to the hospital in the story?
- What was one thing that happened in the hospital? Why?
 ✓ Continue this line of questioning until all occurrences are discussed. Use the book to help the students remember the story.

2. Discuss the students' own experiences.

Ask such questions as these:

- Has anyone had to go to the hospital? Why?
 ✓ Include visiting patients, seeing a new baby, as well as times of being a patient.
- Where did you go in the hospital?
 ✓ Get at such places as the nursery, a patient's room, X-ray, emergency, surgery, a ward, and so forth.
- How did you feel when you went to the hospital? Why?
- Did you know what was going to happen when you went to the hospital? Why?
 ✓ Get at who told them and how they told them.
- What did you take with you when you went to the hospital?
 ✓ Include gifts and things to play with while waiting as well as things for a stay.

- What did you do when you visited or stayed at the hospital?
 - How did you like the people in the hospital?
3. **If students go to the hospital during the year, have them report on what happened.**
 4. **Have the students draw pictures about what hospitals do for us and make a bulletin board display. Have them use Student Page K.6.14 WHAT HOSPITALS DO FOR US.**
-

EXTENSIONS

- Invite a hospital nurse or doctor to be a class guest and answer the students' questions about hospitals.
- A field trip to a hospital may be possible.



K.6.15 RAINCOATS

OBJECTIVES

The students

- design and make emergency raincoats
- test their raincoats and modify them as needed
- design a storage bag for their raincoat

BACKGROUND

RAINCOATS is part of the series of activities dealing with the human body's need for protection. It usually follows K.6.8 APRONS and precedes K.6.16 TESTING RAINCOATS and K.6.17 WET AND COLD. Other activities in the series are K.6.18 KEEPING WARM INDOORS, K.6.19 KEEPING COOL INDOORS, and K.6.20 HAND AND FOOT PROTECTION.

Logic for the activity

RAINCOATS focuses on the need to keep our bodies warm and dry. Emergency raincoats are invented to protect the students. This is another opportunity to involve older students in helping kindergartners.

Storage

A plastic bag or envelope should be invented to hold the raincoat and identify its owner. After use, raincoats should be dried, folded, and stored for later use.

STUDENT ROLES

Meteorologist
Physiologist
Inventor

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MATERIALS

plastic trash bags
 waterproof tapes
 string
 scissors
 waterproof markers
 resealable bags for storage of raincoats (optional)
 hose and sprinkler
 large fan
 Student Page K.6.15 MY RAINCOAT DESIGN

PRODUCTS

Emergency raincoats
 Completed Student Pages

PROCEDURES

1. Discuss the functions of raincoats with the class.

Ask questions such as these:

- Why do you need raincoats?
- What does a raincoat do?
- What happens if you do not have a raincoat when you need it?
- How does it feel when you are wet?
- How does it feel in a cold wind when you are wet?

2. Have the students invent *emergency* raincoats. CAUTION: Warn students that plastic bags can be dangerous. Review and discuss the aphorism in K.6.8 APRONS. Have them use the Inventor's Box for supplies.

Ask such questions as these if they are needed:

- Is your raincoat a cape, poncho, or coat?
- Does it have armholes, sleeves, a belt, openings and closures, pockets, air vents?
- Does it have a rain hat or rain hood to keep rain off your head?

- How long should your raincoat be? Why?
- How will you know which raincoat is yours?

3. Have the students test their raincoats.

Have them do the following:

- Try on their raincoats in the classroom to see how well they fit.
✓ Make adjustments as needed.
- Test their raincoats in the rain or under a sprinkler.
- Test the raincoats in wind or the breeze from a fan.
- Compare how it feels in wind and windless conditions.
- Modify raincoats as needed based on test results.

4. Discuss the test results with the class.

Ask such questions as these:

- How are your raincoats similar?
- How are your raincoats different?
- How effective was your raincoat in the rain?
- How effective was your raincoat in the wind?
- What does a cold wind do to you?
- Why do you think a plastic raincoat helps keep us warm in a cold wind?

5. Have the students design and make a storage bag for their raincoats. Have them identify their bag with their name or initials.

- Have them practice folding their raincoats to fit into their storage bag.
- Have them check to make sure that the raincoats are dried thoroughly to prevent mildew.
- Discuss ways of drying the raincoat and cleaning them.

- 6. Have the students draw the design of their raincoat, front and back view, on Student Page K.6.15 RAINCOAT DESIGN.**
-

EXTENSIONS

- Have them measure their raincoats and show the dimensions on their design drawing.
- Have the students design rain hats.
- Have a raincoat fashion parade.



K.6.16 TESTING RAINCOATS

OBJECTIVES

The students

- recall the warmth produced by having a raincoat on while in the classroom
- investigate to find that warmth when wearing protective clothing comes from their bodies

BACKGROUND

TESTING RAINCOATS is part of the body protection series. It usually follows K.6.8 APRONS, always comes after K.6.15 RAINCOATS, and usually precedes K.6.17 WET AND COLD, K.6.18 KEEPING WARM INDOORS, K.6.19 KEEPING COOL INDOORS, and K.6.20 HAND AND FOOT PROTECTION.

Logic for the activity

In this activity, the students recall how warm they were when wearing their raincoats in the classroom. They hypothesize about why this is so. Then, they design investigations to find the source of warmth when they wear a plastic raincoat.

Thermometers

Before introducing TESTING RAINCOATS the students should be able to compare different thermometer readings. They need to record readings, know which readings are higher and lower, and the meaning of higher and lower readings.

Investigations

This is an open-ended investigation situation for the students to test their ideas. You, of course, can have groups test your ideas or test them yourself.

A plastic raincoat wrapped around a thermometer and plastic raincoat trapping air with a thermometer inside will have little or no effect on temperature. A dramatic increase in temperature will occur when a raincoat is wrapped around a human body. This indicates that the human body is the probable source of warmth.

STUDENT ROLES

Scientist
Equipment engineers

MATERIALS

thermometers
raincoats
plastic bags
other materials as requested by students
Student Page K.6.16 TESTING MY RAINCOATS

PRODUCTS

Class chart about warm clothes and cool clothes
Experiments
Completed Student Pages

PROCEDURES**1. Discuss ways of getting warm.**

Ask such questions as these:

- What are some things you can do to get warm when you are cold?
- What should you do with wet clothes?
- How do you think shivers help your body keep warm?
✓ Get at the idea that the body is caused to move, and movement tends to warm us. Relate this to running on the playground when it is cold.

2. Help the students recall the feeling of being very warm when they were wearing their raincoats in the classroom.

Ask such questions as these:

- Did anyone feel warm when you had your raincoat on in the classroom?
- Where do you think the warmth come from?

- Was it from the raincoat?
- Was it from the air in the classroom?
- Was it from your body?
- Was it from some other thing? If so, what?

3. Have the students work in groups to invent ways of testing their ideas.

- If the students suggest that warmth comes from the raincoat, they might test that idea by wrapping a raincoat around a thermometer to see whether the temperature rises.
✓ This is an ideal time to use a raincoat that is made of clear plastic.
- If air is considered the source of heat, air can be trapped with a thermometer in the raincoat to see whether the temperature rises.
✓ This is an ideal time to use a raincoat that is made of clear plastic.
- If they think their bodies produce the heat, check their body temperature and compare it with the air around them.
✓ Have the student put on the raincoat and see what happens to the temperature inside it.

4. Help the students carry out their investigations. Have them record their data on Student Page K.6.16 TESTING MY RAINCOAT.

5. Have each group report their test results to the class.

Ask such questions as these:

- Where did you think the warmth came from?
- What did you do to test your idea?
- What happened?
- What did your test results tell you about your idea?
✓ Work to the idea that the thermometer only got warmer than the room temperature when the raincoat was warm..
✓ Warmth seemed to have come from the body.

6. Summarize the results with the class.

Ask such questions as these:

- Which ideas about the warmth seem to be right or supported by the experiments? Why?
- How do your raincoats seem to help keep you war?
 - ✓ The plastic seems to keep in body heat?
- Can you think of other times when body heat seems to keep you warm?
 - ✓ Get at such ideas as you are wearing warm clothes or are under a blanket.

EXTENSION

- Discuss how warm and cool clothes are different.
 - ✓ Help the students see that cool clothes allow heat to pass through them and warm ones provide more of a barrier.
 - ✓ Have them look for such things as the thinness or thickness of the garment.
 - ✓ Color is also a factor that could be investigated.



K.6.17 WET AND COLD

OBJECTIVES

The students

- observe and report on the physical effect of being wet
- predict the time it will take their clothes to dry

BACKGROUND

WET AND COLD is part of the body-protection series. It usually follows K.6.8 APRONS, K.6.15 RAINCOATS, and K.6.16 TESTING RAINCOATS. Others in the series are K.6.18 KEEPING WARM INDOORS, K.6.19 KEEPING COOL INDOORS, and K.6.20 HAND AND FOOT PROTECTION.

WET AND COLD reinforces the association of chill with wet clothes first introduced in K.6.15 RAINCOATS. It gives the students a chance to invent an investigation of the relative time needed to dry samples of different clothing materials.

When to do the activity

Carry out the first part of the activity (Procedures 1-3) on one of the first cold, rainy, or snowy days of fall. By becoming conscious of their own feelings of cold, the students gain a sense of why it is necessary to stay dry. The second part of the activity, testing the speed of drying materials (Procedures 4-5) can be done at a different time, preferably on a sunny day.

Clothing materials

To test the relative speed of drying of clothing materials use square samples about 2 in. x 2 in. Materials can be cotton, wool, synthetics (rayon, nylon, and so forth), plastic, and so forth. Three different samples will be sufficient.

Testing for dryness

One can feel moisture by comparing a dry piece of cloth and a moist one. A piece of colored construction paper can also be used. Pressed against a moist piece of cloth, it will be discolored by the moisture.

BEST COPY AVAILABLE

STUDENT ROLES

Textile researcher
Observer

MATERIALS

chart paper
markers
small pan for water
samples of material
colored construction paper.
Student Page K.6.17 DRYING TIMES

PRODUCT

Completed Student Pages

PROCEDURES

1. **Introduce the activity when students take off their coats on a cold and rainy or snowy day. Have them feel their dresses and pants.**

Ask such questions as these:

- Why do you think you take off your wet coats and other gear when you come into the classroom?
- Why might you want to leave as much water outside the room as possible?
- How can you get water off your coats and other gear?
- What might happen if you did not take off your wet coats and other gear?
- Is any part of your clothing still wet?
- Do the wet parts of your clothing feel different on your body from the dry parts? How do they feel?
✓ Get at the sensation of wet clothing feeling cooler.

- 2. Have students whose clothes are still wet make predictions about how long it will take for their clothes to dry. A small amount of water from a medicine dropper can be squirted on skirt or pants of those who are dry. Deliver water where the clothes are over the knee so that the coldness can be felt.**

- List the predictions on the board.
- Every four to five minutes ask, Are your clothes dry yet?
✓ Record how long it takes before everyone's clothes are dry.
- How do you know you clothes are dry?
✓ They are no longer feel cold or placing a piece of construction paper on the cloth to see whether it is dry.
✓ Moisture will make colored construction paper will change depth of color.

3. Summarize the investigation.

Ask such questions as these:

- Did it take about the same time for everyone's clothes to get dry?
- Why do you think that it took longer for some clothes to get dry than it took others?
✓ Get at the idea that some clothes could have been wetter, some materials different.
- Which materials seem to dry first?
✓ Create a drying time chart. List the materials the seemed to dry first, second, third, and so forth.
- Now that your clothes are dry, how do you feel?
✓ Work to the idea of feeling warmer.
- Would you rather have wet or dry clothes on? Why?
- Are there times when you would rather have wet clothes on?
✓ Work to the idea that in the heat of summer wet clothes might be desirable.
- Why is it that you don't feel as cold when you are wet and working and playing outside as you do when you come indoors and are sitting still?
✓ Get at the idea that you are warmer when you are moving a lot.

- 4. On a sunny day, have the students invent ways to see which fabrics dry the fastest. Provide an Inventors Box with samples of different fabrics and have the students predict which one will dry out first. Use Student Page K.6.17 DRYING TIMES.**

Ask such questions as these:

- How can you be sure the fabric samples are equally wet?
✓ Get at such ideas as soaking them in a pan of water and shaking them thoroughly when they are taken out to remove excess water.
- How can you tell when they are dry?
✓ Get at such things as comparing the feel of a dry piece of cloth with one that was wet or putting a piece colored construction paper on a sample and pressing down to see whether the paper is moistened.
- How do you know which sample takes the longest to dry?
✓ Get at starting the tests of a certain set of materials at the same time and seeing which one dries out first, second, and so forth.
- Which ones do you predict will dry first, second, third, and so forth?
✓ Add predictions to the drying time chart.

- 5. Carry out the investigation and report the order of drying.**

Ask such questions as these:

- Which sample seemed to dry the fastest, second fastest, third fastest?
✓ Complete the drying time chart. List the materials that dried first, second, third, and so forth.
- How do the results compare with your predictions? With your experience with drying clothes?
- What kinds of materials will probably keep you the driest?

EXTENSION

- Have the students make a display to show how the investigation of how fast materials dry was carried out.



K.6.18 KEEPING WARM INDOORS

OBJECTIVES

The students

- investigate how the classroom is heated
- investigate how heat is regulated in the classroom

BACKGROUND

KEEPING WARM INDOORS is part of the body-protection series which includes Activities K.6.8 APRONS, K.6.15 RAINCOATS, K.6.16 TESTING RAINCOATS, and K.6.17 WET AND COLD, K.6.19 KEEPING COOL INDOORS, and K.6.20 HAND AND FOOT PROTECTION. KEEPING WARM INDOORS parallels study of how wild and domesticated animals keep warm in Activity K.3.16 HOW ANIMALS KEEP WARM.

Logic for the activity

In KEEPING WARM INDOORS the students are introduced to how heat is produced and regulated in the school and classroom. Any trip to the furnace room should be recorded on the class maintenance chart from Activity K.8.5 REPAIRING THINGS. If there is no central heating, the students should be introduced to whatever system is used in the school.

When to do the activity

In schools where classrooms are heated, this activity can be carried out anytime after the heat in the building has been turned on.

Follow up

It is a good idea to have the students write a letter to the maintenance staff asking to take a tour through the furnace room. After they have taken the tour have them write thank-yous and send along some of the students' drawings.

STUDENT ROLE

Heating engineer

MATERIALS

chart paper

markers

Student Page K.6.18 THERMOSTATS AND TEMPERATURES

PRODUCTS

Thank-you letters

Completed Student Pages

PROCEDURES

1. **Report that the heat in the school has been turned on and that the class needs to find out about regulating the temperature. Have the students measure the temperature in the classroom.**

Ask such questions as these:

- At what temperature should one try to keep the classroom in winter?
✓ Check with the administration for district guidelines.
 - Do we need to wear heavy clothes in the classroom?
 - What advantages are there in not having to wear heavy clothes?
 - Do you feel comfortable in the classroom at this temperature?
 - Why do you think it might be important to keep the temperature in all the classrooms the same temperature?
✓ When the temperature is constant, there is no sudden experience of coldness or hotness. This is easier on the body.
✓ Many heating systems are built to keep the entire school plant at the same temperature.
 - How is the temperature adjusted in the classroom?
2. **If there is a thermostat in the classroom, show the students where it is located.**
- Ask questions such as these:
- Does anyone know what a thermostat is?
 - What do you use a thermostat for?

- Can someone describe the thermostat?
 - Does anyone know how to operate the thermostat?
✓ Have a student or maintenance person show how to adjust the heat or do it yourself.
 - Does the thermostat read in Fahrenheit or Celsius degrees?
How can you tell?
 - Does anyone know what the word *regulate* means?
 - What does it mean when someone say that a thermostat *regulates temperature*?
 - How would you set the thermostat for 68 degrees? For 69 degrees? For 70 degrees? Is this Fahrenheit or Celsius? How do you know?
 - Why don't you want the room to get much above 72 degrees?
✓ Work for the idea of comfort and using less heat.
3. **If possible, have the students check the thermostat and read the classroom temperature each morning and afternoon. Have them record thermostat setting and classroom temperatures on a class chart and on Student Page K.6.18 THERMOSTATS AND TEMPERATURES.**

After a week or two ask such questions as these:

- Are the thermostat settings the same or different in the morning and afternoon?
 - Are the thermostat settings and the temperatures always the same? If not, why do you think they might be different?
 - What makes the classroom temperature change?
 - What happens when they are different?
4. **If there is central heating in the school, plan to take a class trip to the furnace room.**
- Arrange with the janitor or other maintenance personnel to be present to answer questions and conduct a tour.
 - Have the students write a letter asking to be shown the facilities.

5. Help the students make a list of questions that they want to ask.

Help the students include such questions as these:

- Where does the classroom's heat come from?
- How much heat does the furnace produce compared to the furnace in a house?
- How does the heat get from the furnace to the classroom?
- How is the temperature in the building, classroom, and furnace regulated?
- Are some parts of the building warmer than others? Why?
- What happens to the furnace at night? Why?
- What happens to the furnace on weekends? Why?
- What happens to the furnace over a holiday? Why?

6. Go on the class field trip.

- Prompt students to ask their questions and don't hesitate to be as curious as the students.
 ✓ You may want to give the tour guide the questions ahead of time.

7. When the students return, have them review their questions and answers.

8. Have the students write thank-you letters to the maintenance personnel.

9. Have the students compare the ways people stay warm and the ways other animals stay warm.

EXTENSIONS

- Have the students make sketches or a class mural showing the furnace room and school and the way the heat is distributed.
- Have the students make sketches or a class mural comparing the ways people stay warm and the ways other animals stay warm.



K.6.19 KEEPING COOL INDOORS

OBJECTIVES

The students

- investigate how the classroom can be cooled
- investigate how cooling is regulated in the classroom

BACKGROUND

KEEPING COOL INDOORS is part of the body-protection series. Others in the series are Activities K.6.8 APRONS, K.6.15 RAINCOATS, K.6.16 TESTING RAINCOATS, K.6.17 WET AND COLD, K.6.18 KEEPING WARM INDOORS, and K.6.20 HAND AND FOOT PROTECTION. KEEPING COOL INDOORS parallels study of how animals keep cool in Activity K.3.17 HOW ANIMALS KEEP COOL.

Logic for the activity

This activity can be carried out anytime the weather turns hot. It starts with personal comfort and the clothes that students wear to give them a sense of coolness. Then the students investigate how the room is or can be cooled. In many schools there will be no air conditioning, and coolness in the classroom will be regulated by shadow and air circulation.

Field trip

In schools where there is central air conditioning, a trip to see the air conditioning unit should be recorded on the class maintenance chart from Activity K.8.5 REPAIRING THINGS. It is a good idea to have the students write a letter to the maintenance staff asking to take a tour to see how the school is air conditioned. Afterwards have them write a thank-you for the tour.

STUDENT ROLE

Air conditioning engineer

MATERIAL

Student Page K.1.19 COOLING THE ROOM

PRODUCTS

Thank-you notes
Completed Student Pages

PROCEDURES

1. **Observe that the weather has gotten warmer, heat in the school has been turned off, and the class needs to find out how the classroom is kept cool. Have the students measure the temperature in the classroom.**

Ask such questions as these:

- How can you help regulate your body temperature by the clothes you wear?
✓ Work to the idea of wearing light colored and lightweight clothes.
- What advantages are there in wearing lightweight clothes?
- Do you feel comfortable in the classroom at the present temperature?
- At what temperature do you think you should try to keep the classroom in warm weather?
✓ Check with the administration for district guidelines.
- What do you think happens when people get too hot and cannot cool off?
✓ Get at the idea of discomfort and the extreme case of heat stroke or heat exhaustion.
- How might the temperature in the classroom be adjusted?
- What does opening the windows do?
✓ There will be the potential for two answers. If air conditioning is in operation, it may work against the air conditioning. If there is no air conditioning, it may allow a breeze to enter the room.

- Is it warmer outside or inside the classroom? How can we find out?
✓ This can be tested with a thermometer.
- If it is hotter outside, why is this so?
✓ This will be due to the weather.
- If it is hotter inside, why is this so?
✓ This might be due to a furnace that is still on, the heat of bodies, or a greenhouse effect of heat trapped behind glass windows.

2. If there is a thermostat in the classroom, show the students where it is located.

Ask questions such as these:

- Who remembers where the thermostat is?
- Who remembers what a thermostat is used for?
- Can someone describe the thermostat?
- Does anyone remember how to operate the thermostat?
- Can you show us how to use the thermostat?
- Can anyone tell whether the thermostat uses Fahrenheit or Celsius degrees? How can you tell?
- What does it mean when someone says that a thermostat *regulates temperature*?
- How would you set the thermostat for 68 degrees? For 69 degrees? For 70 degrees? Is this Fahrenheit or Celsius? How do you know?
- Why don't you want the room to get much above 72° F?
✓ Get at idea that the normal comfort range is 68-72° F.

3. If possible, have the students observe the thermostat temperature each morning and afternoon. Have them record thermostat settings and classroom temperatures on Student Page K.6.19 COOLING THE ROOM or a class chart.

After a week or two ask such questions as these:

- Are the thermostat settings and the classroom temperatures always the same?

- What makes the classroom temperature change?
 - If there is no air conditioning, how can rooms be kept cool?
 - ✓ Get at the idea that windows or doors can be opened to breezes, sprinklers can be turned on outside an opened window, fans can be used, and so forth.
- 4. If there is central air conditioning in the school, plan to take a class trip to see the air conditioner.**
- Arrange with maintenance personnel to lead the tour and answer questions.
 - Have the students write a letter asking to be shown the facilities.
- 5. Help the students make a list of questions that they want to ask.**
- Help them include such questions as these:
- Where is the air conditioner located?
 - How does cold air get to the classroom?
 - How and where is the temperature of the classroom regulated?
 - What is the setting of the thermostat? Why?
 - Are some parts of the building cooler than others? Why?
 - What happens to the air conditioner at night? Why?
 - What happens to the air conditioner on weekends? Why?
 - What happens to the air conditioner over a holiday? Why?
- 6. Go on the class field trip. Prompt the students to ask their questions and do not hesitate to be as curious as they are. Send a list of questions to the maintenance personnel before the field trip.**
- 7. Have the students write a thank-you letter to the maintenance personnel.**
- 8. Have the students compare the ways people stay cool and the ways other animals to stay cool.**

EXTENSIONS

- Have the students trace the way that the cool air gets to their classroom.
- Have the students check and report on how their homes are cooled.
- Have the students make sketches or a class mural comparing the ways people stay cool and the ways other animals stay cool.



K.6.20 HAND AND FOOT PROTECTION

OBJECTIVES

The students

- invent ways of protecting their hands and feet under different circumstances
- identify several simple first aid practices
- invent emergency hot pads, cold pads, and shoe protectors

BACKGROUND

HAND AND FOOT PROTECTION is part of the body-protection series. Other activities in the series are K.6.8 APRONS, K.6.15 RAINCOATS, K.6.16 TESTING RAINCOATS, K.6.17 WET AND COLD, K.6.18 KEEPING WARM INDOORS, and K.6.19 KEEPING COOL INDOORS.

Logic for the activity

Here the students are asked to invent various devices to substitute for commercial items. These are all protective devices. The assumption is that there will come a time when standard protective devices may not be available and practice in invention will be helpful.

Entry situations

This activity can be used in parts or as a whole. It can be triggered by situations that call for protection or it can be treated as a general set of problems. Students are asked to invent emergency devices to substitute for things normally employed. They are asked to devise ways to protect themselves from scratches, thorns, cold, and mud. This can be done using the Inventor's Box.

First Aid

Certain first-aid suggestions are given. When used, make their application a demonstration for all to observe.

STUDENT ROLES

Observer
Inventor
Provider of first aid

MATERIALS

Gloves for handling animals (if needed)
 small sticks
 plastic bags
 cloth sacks
 rags
 cardboard
 light rope
 string
 tape
 assorted safety pins
 newspapers
 other materials as requested by the students
 Student Page K.6.20 HAND AND FOOT PROTECTION

PRODUCTS

Hand and foot protectors
 Completed Student Pages

PROCEDURES

1. **Handling animals**—Discuss why we might need to protect our hands when handling animals and what we can use for protection. Help the students identify or invent hand protectors and draw pictures of them on Student Page K.6.20 HAND AND FOOT PROTECTION.

Ask such questions as these:

- Has anyone ever been scratched by an animal?
- How did it happen?
- Why do you think the animal scratched you?
- What did you do to the scratches?
 ✓ Get at the need to wash the wound and inform an adult.
- Did the scratches heal?
- Has anyone ever been bitten by an animal?
- How did it happen?
- Why do think the animal bit you?
- How did you take care of the bite?

- How could you protect your hands from scratches and bites when you handle your class pet?
 - ✓ Show any gloves that are to be used and check to be sure that the students wear them.
 - ✓ Not all animals will require gloves.
 - How can you protect your hands from contamination with feces and urine?
 - ✓ Get at the idea of using plastic gloves, covering the hands with plastic, and so forth.
- 2. Cold weather—Discuss why we need to protect our hands when it is cold outdoors and what we can use for protection. Then have the students invent a way of keeping gloves from getting lost. Have them draw pictures and record their invention on Student Page K.6.20 HAND AND FOOT PROTECTION.**

Ask such questions as these:

- When it is cold, what happens to your hands?
 - What color do your hands turn?
 - What happens if your hands get too cold?
 - ✓ Get at the problem of *frostbite*.
 - What can you do to warm your hands?
 - How do you protect your hands from cold?
 - Where do you put your gloves or mittens when you are at school?
 - How can we keep from losing your gloves or mittens?
 - ✓ Help the students invent ways to prevent loss of gloves or mittens.
 - ✓ Ideas might include a glove-bag safety-pinned on the inside of a coat, a glove-bag on a belt, gloves tied to a string pinned to the inside back of a jacket and running down each sleeve. Gloves on a string are left dangling from the sleeves when the jacket is taken off.
- 3. Cold weather—Discuss the problem of getting one's ears too cold. Help the students invent emergency ear protectors. Have them draw pictures and record their invention on Student Page K.6.20 HAND AND FOOT PROTECTION.**

Ask such questions as these:

- Has anyone's ears ever gotten too cold?
- What did it feel like?

- What did it feel like as they warmed up?
 - What happens if your ears get too cold?
✓ Get at the problem of *frostbite*.
 - How can you keep your ears warm?
 - How can you protect your ears from cold?
✓ Help the students invent ways to keep their ears warm.
✓ Get at such things as pulling cap over the ears, tying cloth or plastic over the ears, and so forth.
4. **Cold things—Discuss why we need to protect our hands when handling cold things and what we can use for protection. Help the students invent ways to handle very cold things. Have them draw pictures and record their invention on Student Page K.6.20 HAND AND FOOT PROTECTION.**

Ask such questions as these:

- Have you ever touched something that was very cold?
 - What did it feel like?
 - What did it do to you?
 - How can you hold things that are very cold?
 - How can you protect your hands?
✓ Help the students invent ways to protect their hands.
✓ Get at such things as using thicknesses of cloth or paper to insulate the hand.
5. **Hot things—Discuss why we need to protect our hands when handling hot things and what we can use for protection. Help the students invent ways of handling a hot pot, plate, skillet, or pan. Have them draw pictures and record their invention on Student Page K.6.20 HAND AND FOOT PROTECTION.**

Ask such questions as these:

- Have you ever touched something that was very hot?
- What did it feel like?
- What did it do to you?
- What do you do with a burn?
✓ Get at the need to run cold water over the burned area and tell an adult.

- How can you hold hot things?
- How do you protect your hands?
 - ✓ Help the students invent ways to protect their hands.
 - ✓ Get at such things as using thicknesses of cloth or paper to insulate the hand.

6. Sharp things—Discuss what we can use to protect ourselves when picking up glass or using scissors, knives, and other sharp tools.

Ask such questions as these:

- Have you ever been cut by glass or a sharp tool such as a pair of scissors, knife, or hoe?
- How was the wound treated?
- Who treated the wound?
- How can you help to prevent such cuts?
 - ✓ Get at such things as sweeping broken glass into a dust pan and picking it up with gloves or a wet paper towel.
 - ✓ Go over ways of carrying tools, using, and handing tools to another person.

7. Puncturing things—Discuss what we can use to protect our hands when you handle thorny and broken things. Help the students invent ways of picking up things that can puncture them. Have them draw pictures and record their invention on Student Page K.6.20 HAND AND FOOT PROTECTION.

Ask such questions as these:

- Have you ever tried to pick up a branch of a bush with sharp thorns?
- What happened when you tried to pick the thorny branch up?
- What did the thorns do to you?
- How did you treat the wound?
 - ✓ Get at the need to clean the wound and inform an adult.
- How can you pick up things that have thorns with your hands?
- How can you protect your hands?
 - ✓ Help the students invent ways to protect their hands.
 - ✓ Get at such things as wearing gloves; wrapping hands with cloth or plastic; putting thicknesses of newspaper over the thorns to pick them up.

- 8. Cold ground—Discuss why we need to protect our feet when it is cold and what we can use for protection. Have the students invent an emergency way of keeping their feet warm. Have them draw pictures and record their invention on Student Page K.6.20 HAND AND FOOT PROTECTION.**

Ask such questions as these:

- Have you ever walked in snow and had your feet get too cold?
- What did it feel like?
- What are the dangers of getting your feet too cold?
 - ✓ Get at the problem of *frostbite*.
- How can you keep your feet warm?
 - ✓ Help the students invent ways to protect their feet.
 - ✓ Get at such things as wrapping the feet and shoes with cloth.

- 9. Wet ground—Discuss why we need to protect our feet and shoes when the ground is wet and what we can use for protection. Have the students invent an emergency way of protecting their feet from getting wet. Have them draw pictures and record their invention on Student Page K.6.20 HAND AND FOOT PROTECTION.**

Ask such questions as these:

- Did you ever get your feet wet when you walked in the rain or snow on a cold day?
- What did it feel like? Did your feet stay cold?
- How do you protect your feet from getting wet?
 - ✓ Help the students invent ways to protect their feet.
 - ✓ Get at such things as wrapping the feet with plastic.

EXTENSIONS

- Have the students list other situations where they might need to invent ways of protecting their hands feet, ears, nose, or other exposed body parts.
- Have the students construct devices that they have invented in the activity.
- Make a display showing their emergency devices.



K.6.21 GETTING LOST

OBJECTIVES

The students

- learn how to tell when they are lost
- share feelings of being lost
- create strategies for what to do when lost
- learn their home address and phone number

BACKGROUND

Getting lost is a common experience for young students. It is a time of fear and danger. This activity uses the Focus Book *Somebody's Lost* to initiate discussion of what to do if someone gets lost. The story is about a lost puppet. It may be helpful to use a puppet to lead the discussion. This may bring back very emotional memories for some children and caution should be used when discussing these past experiences.

Timing

GETTING LOST can be introduced any time. However, the greatest impact comes when someone in the class reports getting lost or a report about someone getting lost appears in the news.

Rhyme

Students can memorize the "Where I Live Rhyme." This can be sent home to help parents work with their child. If address information is a sensitive issue with parents, it need not be shared in class.

Telephone numbers

Telephone numbers can be memorized by using a touch-tone phone. Dial the number listening to the number tune produced by the phone. Have the students sing the numbers as they dial.

Using 911

Remind the students that no coins are needed to get the emergency number 911 in most places. Emphasize that it must be used *only* for emergencies.

STUDENT ROLES

Wayfinder
Safety expert

MATERIALS

Focus Book *Somebody's Lost*
Student Page K.6.21 WHERE I LIVE

PRODUCT

Completed Student Pages

PROCEDURES**1. Read the Focus Book *Somebody's Lost*.**

Help the students recall the story by asking such questions as these:

- Where does the story take place?
- Who are the characters in the story?
- Who gets lost in the story?
- How did the puppet get lost?
- How did the puppet know it was lost?
- What did the puppet think about doing when it discovered it was lost?
- What did the puppet really do?
- How was the puppet found?

2. Discuss the students' own experiences.

Ask such questions as these:

- Has anyone ever been lost?
- Where were you lost?

- How did you know when you were lost?
- How did you feel when you were lost?
- Did you know what to do when you got lost?
- What did you do?
- How were you found?
- Who found you?

3. Discuss more thoroughly how you can tell when you are lost.

Get at such ideas as these:

- No one is around that you know.
- Things around you seem strange.
- You can't find your way to where you are supposed to be.

4. Discuss more thoroughly places where students can get lost.

Help the students include such places and ideas as these:

- Stores and malls.
- Crowded outdoor places such as fairs, amusement places, cities, and so forth.
- At night anywhere.
- While traveling.
- Outdoor places such as forests, parks, and so forth.

5. Discuss with the students how to help prevent getting lost.

Include such things as these:

- Having a family plan as to where to meet if people get separated when in stores or on outings.
- Always letting someone, preferably an adult, know where you are going.
- Going only where you said you were going.

- Going with a group of people.
- Knowing your phone number, your family's name, your street and house number, the city you live in, the state you live in, and the country you live in.

6. Discuss with the class what to do if one gets lost.

Include such ideas as these:

- Who you can safely ask for help.
- Using 911.
- Calling or yelling for help when lost outside.
- Staying in one place especially if it is dark.

7. Have the students play the "This Is What I'd Do" game by acting out a "lost" situations. Puppets can be used.

Help the students create such situations as these:

- Getting separated from their parent in a department store.
- Getting separated from their family when buying hot dogs at a ball game.
- Taking a wrong turn when going home from a new friend's house.
- Getting separated from their family at night when walking home in a crowd.
- Chasing a lizard in a campground and not being able to find their way back to where the family tent is.

8. Have students act out their solutions to the problems. Discuss the solutions with the students.

9. Introduce and send home the address rhyme and telephone tune technique with the students.

Ask the family to do the following:

- Fill in the child's name, house number, street, and so forth, in the rhyme on Student Page K.6.21 WHERE I LIVE.
- Work with their child to memorize the rhyme.

- Play the phone number on a touch-tone phone to memorize their individual dialing song.

WHERE I LIVE RHYME

My name is _____, that's me.
 My home is at _____, you see.
 My (town/city), _____, is great,
 It's in _____, the state.
 And the USA is my country.

EXAMPLE

My name is Alice Rohone, that's me.
 I live at 612 Maple Lane, you see.
 My city, Honolulu, is great,
 It's in Hawaii, the state.
 And the USA, is my country.

EXTENSIONS

- Check periodically to see whether students can say the address rhyme and sing their telephone number tunes.
- Share success stories from the newspaper about lost children and what they did to get back home. Discuss the appropriateness of their actions.



GROWTH CHART K.6.1A

Name _____

Birthdate _____

GRADE	DATE Month/Year	HEIGHT		WEIGHT/MASS		HAND (sq. cm)	FOOT (sq. cm)
		(in)	(cm)	(lb)	(kg)		
K							
1							
2							
3							
4							
5							
6							

Name _____

Date _____

This image shows a full page of blank graph paper. The grid consists of small, equal-sized squares formed by thin black lines. There are 20 columns and 20 rows of squares, creating a total of 400 square units. The lines are evenly spaced and extend across the entire area of the page, leaving no margins or additional markings.



TOOTH CHART K.6.2

Name _____

Date _____

Blacken any missing teeth.

Circle any new teeth.

Put an X on any teeth with cavities, fillings, or caps.



How many teeth do you have?

How many teeth have you lost?

How many new teeth do you have?



**TOOTH BRUSHING
CHART
K.6.3**

Name _____

Date _____

DATE	MORNING		BEDTIME	
	YES	NO	YES	NO



WASHING HANDS K.6.6

Name _____

Date _____





**BATHROOM
POSTER
SP K.6.7**

Name _____

Date _____

Draw a poster about good bathroom habits.

**APRONS**
SP K.6.8

Name _____

Date _____

Draw pictures of different ways to use your plastic bag apron.



**BATHROOM
POSTER
SP K.6.9**

Name _____

Date _____

Draw your Fountains and Faucets poster.



**WHERE ARE THE
GERMS?
K.6.10**

Name _____

Date _____

Draw a picture. Make a black X on all the places where germs might hide.



FEELING SICK
K.6.11

Name _____

Date _____

Draw a picture story about a time when you were sick.
Be sure to show how you felt in your picture.



**A DOCTOR'S
TOOLS
K.6.12**

Name _____

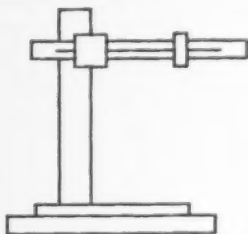
Date _____

Color the pictures.

Draw lines from the pictures to their names.



scale



otoscope



thermometer



tongue depressor



stethoscope

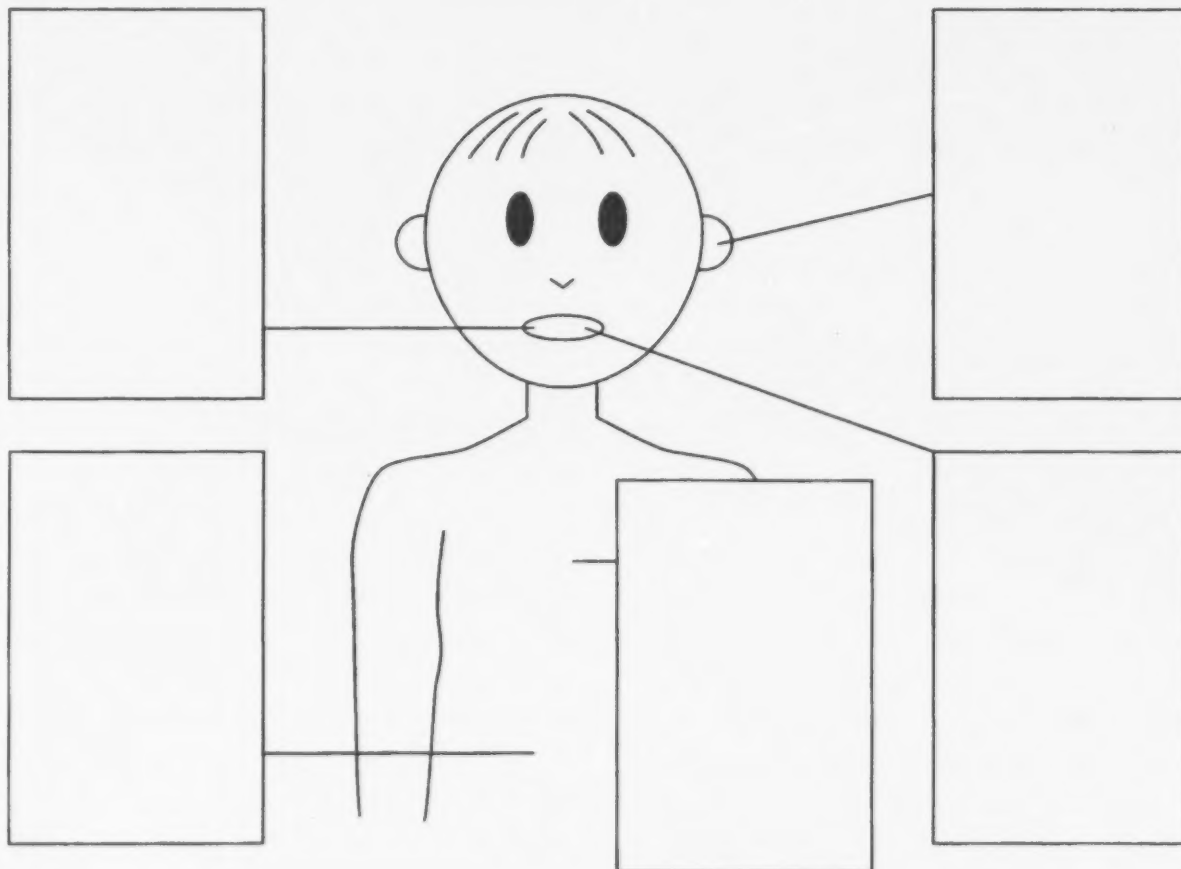


WHAT DOCTORS DO K.6.13

Name _____

Date _____

Cut out the pictures of the doctor's tools. Glue each to the square that points to where the doctor uses them.



THERMOMETER



STETHOSCOPE

TONGUE
DEPRESSOR

OTOSCOPE



FINGERS





**GOING TO THE
HOSPITAL
K.6.14**

Name _____

Date _____

Draw and color a story about going to the hospital.



**MY RAINCOAT
DESIGN
K.6.15**

Name _____

Date _____

Draw a picture of your raincoat so someone else can make one.



**TESTING MY
RAINCOAT
K.6.16**

Name _____

Date _____

Draw a picture to show where you think the warmth comes from when you wear your raincoat.

Draw a picture to show how you tested your idea of where the warmth comes from.

Draw a picture to show what happened when you tested your idea.



DRYING TIMES
SP K.6.17

Name _____

Date _____

FABRIC	PREDICTED ORDER OF DRYING	ACTUAL ORDER OF DRYING



**THERMOSTATS AND
TEMPERATURES
K.6.18**

Name _____

Date _____

DATE	TIME	THERMOSTAT SETTING		CLASSROOM TEMPERATURE	
		°C	°F	°C	°F



**COOLING THE
ROOM
K.6.19**

Name _____

Date _____

DATE	TIME	THERMOSTAT SETTING		CLASSROOM TEMPERATURE	
		°C	°F	°C	°F



**PROTECTING MY
HANDS AND FEET
K.6.20**

Name: _____

Date: _____

Draw pictures to show ways to protect your hands and feet.



**WHERE I LIVE
K.6.21**

Name _____

Date _____

Dear Parents,

Please fill in the following information and then help your child use the doggerel.

WHERE I LIVE DOGGEREL

My name is _____, that's me.

My home is at _____, you see.

My (town/city), _____, is great.

It's in _____, the state.

I'm a U.S. citizen, that's a guarantee!

EXAMPLE

My name is Alice Roe, that's me.

My home is at 612 Maple Lane, you see.

My (city), Hilo, is great.

It's in Hawaii, the state.

I'm a U.S. citizen, that's a guarantee!

Please also help your child to learn his phone number. One way to teach your child is to sing the number the way it sounds when played on a touch-tone phone.

Thank you.



**KINDERGARTEN
CLUSTER 7**

Wayfinding and Transportation

- K.7.1 Right and Left
- K.7.2 Sunrise
- K.7.3 Sunset
- K.7.4 North and South
- K.7.5 Home Location
- K.7.6 Sidewalks and Walkways
- K.7.7 Roads
- K.7.8 Traffic Simulation Equipment
- K.7.9 Traffic Simulation Mapping
- K.7.10 Traffic Simulation Rules
- K.7.11 Classroom Mapping



K.7.1 RIGHT AND LEFT

OBJECTIVES

The students

- identify right- and left-handedness
- practice using right and left in direction

BACKGROUND

RIGHT AND LEFT is an activity important to three different series. It is part of the series on finding one's way and is usually preceded by Activity K.6.21 GETTING LOST and followed by Activities K.7.2 SUNRISE, K.7.3 SUNSET, K.7.4 NORTH AND SOUTH, and K.7.5 HOME LOCATION. It is part of a series on safety that includes Activities K.7.6 SIDEWALKS AND WALKWAYS, K.7.7 ROADS, K.7.8 TRAFFIC SIMULATION EQUIPMENT, K.7.9 TRAFFIC SIMULATION MAPPING, and K.7.10 TRAFFIC SIMULATION RULES. It is also part of a series on location and mapping that includes Activities K.7.5 HOME LOCATION, K.7.9 TRAFFIC SIMULATION MAPPING, and K.7.11 CLASSROOM MAPPING.

RIGHT AND LEFT uses a dialog-and-game situation to help the students gain facility in using right and left directions.

Student development

Some students will be very conscious of a hand preference in drawing, throwing balls, and grasping things. Help these students identify their preference. Other students may appear to be ambidextrous or undecided. Don't force a choice. However, knowing which is the right and which is the left hand is important. Help the students find the beat of their heart on the left side of their bodies and use this or other contrived devices to remember right and left. Regularly use right and left directions to create patterns.

Matrix game

The matrix on Student Page K.7.1 THE RIGHT-AND-LEFT GAME allows students to direct each other in getting from the center to any point on the matrix using right-left and forward-back directions.

STUDENT ROLE

Wayfinder

MATERIALS

red ribbon (about 8–10 in. per student)

lavender yarn or string for "lavender lines" (about 8–10 in. per student)

lavender and red crayons

Student Page K.7.1 THE RIGHT-AND-LEFT GAME

PRODUCT

Completed Student Pages

PROCEDURES

1. Discuss *right* and *left* with the students.

Ask such questions as these:

- Can you hold your right hand up?
- Can you hold your left hand up?
- How do you know your right hand from your left?
- Which hand do you like to draw with? Is that your right or left hand?
- Which hand do you like to throw a ball with? Is that your right or left hand?
- Which hand do you salute the flag with? Is that your right or left hand?
- On which side of your body can you feel your heart? Is that your right or left side?
✓ This will take some exploration.
- Which side of the car does the driver sit on?
- Which side of the road do you walk on when there are no sidewalks? Is that your right hand or left hand side?

2. Mark the right and left side of things.

Help the students do the following:

- Mark the right and left sides of their desk when they are sitting.
✓ Have them use stickers, markers, or tape.
- Mark directional walking arrows or right feet on the right sides of aisles in the room.
✓ Right feet can be made out of construction paper and arrows out of masking tape.
- Mark directional walking arrows or feet on the right of the hall outside the room.
- Use the mnemonic below:

**Wrap red ribbons 'round right wrists.
Loosely loop lavender lines, labeling left.**

- Wrap red ribbons around their right wrists and yarn or string "lavender lines" around their left wrists to remind them of right and left.

3. Have the students play Simon Says based on using right and left directions.

Below are some suggested commands:

- *Simon says*, "Wave your left hand."
✓ The students wave their left hand because Simon has commanded it.
- Jump to the left.
✓ No one jumps because Simon has not commanded it.
- *Simon says*, "Hop to the left."
✓ The students hop to the left because Simon has commanded it.

Below are some suggested rules:

- Players continue to stand until they have responded correctly 5 times at which time they sit down.
- Seated players help others get five correct responses.

- Players lead the game.
✓ Have the student leaders face the same direction as the other players.
- 4. Have the students play the Right-and-Left-Game using Student Page K.7.1. Have them play in groups of four, with two persons on a team.**
- Team 1 selects a square on the student page and secretly writes down its letter. This is the *goal*.
 - Team 2 starts on the star square.
 - Team 1 then gives directions to Team 2 to find the square using right-and-left and up-and-down directions, one square at a time.
 - When the square has been reached, reverse the roles.
- 5. Ask the families to reinforce the students' understanding of right and left.**

EXTENSIONS

- Run treasure hunts by hiding things according to the number of squares moved on a checkerboard or floor tiles in right-and-left forward-and-back or up-and-down directions. The spaces on the board or floor can be numbered so that final destinations can be recorded before starting.
- Put Student Page K.7.1 THE RIGHT-AND-LEFT GAME in an activity center or use it as a home activity.
- Have the students invent right-left rhymes. Here is a starter:

A Right-Left Rhyme

Remember our right hand's placed over our heart,
Whenever the flag salute we start.



K.7.2 SUNRISE

OBJECTIVES

The students

- discover that the sun rises in the east
- post a classroom marker to show east
- learn a rhyme about the sun rising in the east
- develop a sense of where east is
- begin to use their bodies as compasses

BACKGROUND

SUNRISE is part of the series of activities about finding one's way. It usually follows Activity K.6.21 GETTING LOST and K.7.1 RIGHT AND LEFT and precedes Activities K.7.3 SUNSET, K.7.4 NORTH AND SOUTH, and K.7.5 HOME LOCATION.

Use of rhyme

This is the first of many activities in which the students use their bodies as compasses. Each activity uses verses of rhyme to help the students remember directions. Rhyme, like songs and body motion, has a special way of connecting ideas to long-term memory.

When to start

The activity can be started anytime after the introduction of right and left in Activity K.7.1 RIGHT AND LEFT. In schools in the northern part of the United States, the sun in the winter will rise quite close to the time that school opens, and the students can get a sense of the easterly direction by going outdoors and observing for several days. For schools above the 20th parallel of latitude, the direction of sunrise will be technically *southeast* throughout the year. However, the general *easterly* direction of the sunrise gives a good enough approximation of *east* for students to find their way in all but the most northern latitudes. For more exact determination of *east*, a magnetic compass will be used later in *DASH*.

Parent involvement

This series of activities is another opportunity for parent involvement. See Fig. K.7.2 for a sample letter.

STUDENT ROLE

Wayfinder

MATERIALS

classroom sign pointing east
Student Page K.7.2 EAST: SUNRISE

PRODUCT

Completed Student Pages

PROCEDURES

1. **Discuss directions and sunrise in a place where the students can see where the sun rises.**

Ask such questions as these:

- Where does the sun rise?
- Does anyone know what you call that direction?
✓ Introduce this as *east* though in the Northern Hemisphere above the 20th parallel the direction will technically be *south-east*, however, the sun rises in an easterly direction.
- What do you mean by direction?
✓ Work to such ideas as where you face or point your finger.
✓ Have the students point in a left direction, a right direction.
- What do you mean by sunrise?
✓ Work toward the idea of when you first see the sun come up in the morning.

2. **Have the students place a sign on a classroom wall to mark east, the direction in which the sun rises.**
3. **Read the "Body Compass Rhyme: Sunrise" to the students and have them act it out.**

**Body Compass Rhyme:
Sunrise**

Our body's a compass that we always can use.
With it we can find any direction we choose.

Reach out your right hand to where the sun will rise.
We find *east* where the sun is first seen by our eyes.

Ask such questions as these:

- How do you know which is your right hand?
✓ If needed review the techniques developed in Activity K.7.1
RIGHT AND LEFT.
- Which hand reaches out to the sunrise?
- Your right hand reaches in what direction?
✓ Get at right, rising, in the east.

4. **Ask the parents to help the students identify places and things to the east of their home using SP K.7.2 EAST: SUNRISE. See Fig. K.7.2 for a sample letter.**

EXTENSIONS

- When the students come into class in the morning, have them orient themselves so that they reach out to the rising sun with their right hand. They will be facing north.
- Place the flag on the north wall of the classroom during the flag salute to reinforce the right-left/east-west concept of direction.

Sample Letter to Families

Dear Family:

Our kindergarten class is about to start studying sunrise, sunset, and compass directions. Over the next several weeks I will be asking students to collect information at home. Your assistance in this collection will be greatly appreciated.

Please send the Student Pages back to school with your child.

Thank you for your help.

Fig. K.7.2 Sample letter about sunrise, sunset, and compass directions



K.7.3 SUNSET

OBJECTIVES

The students

- observe that the sun sets in the west
- post a marker in the classroom to show which direction is west
- develop a sense of which direction is west
- continue using their bodies as compasses
- learn additional verses of a rhyme about compass directions

BACKGROUND

SUNSET is part of the series of activities about finding one's way. It is usually preceded by Activities K.6.21 GETTING LOST, K.7.1 RIGHT AND LEFT, and K.7.2 SUNRISE and followed by Activities K.7.4 NORTH AND SOUTH and K.7.5 HOME LOCATION.

As in Activity K.7.2 SUNRISE, the students use their bodies as compasses. Two more verses of the "Body Compass Rhyme" are used to make a way of finding east and west more indelible.

When to start

SUNSET should follow immediately after the introduction of Activity K.7.2 SUNRISE. If this activity is done in winter in northern latitudes of the United States and if kindergarten is a full-day program, the students will be able to see the "almost rising" and "almost setting" sun during school time.

STUDENT ROLE

Wayfinder

MATERIALS

classroom sign pointing west
Student Page K.7.3 WEST: SUNSET

PRODUCT

Completed Student Pages

PROCEDURES**1. Review sunrises and discuss where the sun sets.**

Ask such questions as these:

- Where did you find that the sun rises?
- Can you reach out to the sunrise with your right hand?
✓ Have the students point to the sunrise with their right hand.
- Where do you think the sun sets?
- How can you find out where the sun sets?
- What is that direction called?

2. Send the students home to find the direction of sunset. Use Student Page K.7.3 WEST: SUNSET.

After a review of sunrises the next morning, ask such questions as these:

- Did anyone find out where the sun sets?
- Did anyone find what that direction is called?

3. Have the students stand with their right hands reaching for the sunrise.

Ask such questions as these:

- When your right hand reaches for the *rising* sun, what part of your body points toward the direction of the setting sun?
✓ Work for the idea that it is the left hand that reaches to the *west* and the *setting* or *leaving* sun.
- Can anyone tell us how the sun gets into the *west*?
- Who can show us with their hands?
✓ Have the students trace the sun's path from east to west through the day.

4. Read the "Body Compass Rhyme: Sunrise And Sunset" to the students and have them act it out.

**Body Compass Rhyme:
Sunrise and Sunset**

Our body is a compass that we always can use.
With it we can find any direction we choose.

Reach out your right hand to where the sun will rise.
We find *east* where the sun is first seen by our eyes.

Let your left hand point to where the sun will set.
That's *west* out there now don't forget.

The sun goes o'erhead from the *east* to the *west*,
Before it sinks down and allows us to rest.

Ask such questions as these:

- How do you know which is your left hand?
✓ Review the techniques for finding right and left hands.
- Your left hand points in what direction?

5. Have the students post a sign on the classroom wall indicating the direction of sunset.

EXTENSION

- Have the students start a directions map. Help them show major sites east and west of the school.



K.7.4 NORTH AND SOUTH

OBJECTIVES

The students

- find north and south using their body compass
- continue using their bodies as compasses to locate east and west

BACKGROUND

NORTH AND SOUTH is part of the series of activities about location and finding one's way. It is designed to follow Activities K.6.21 GETTING LOST, K.7.1 RIGHT AND LEFT, K.7.2 SUNRISE, K.7.3 SUNSET, and precede K.7.5 HOME LOCATION. NORTH AND SOUTH should follow as soon as possible after Activity K.7.3 SUNSET.

NORTH AND SOUTH again engages the students in using their bodies as compasses. In this activity the body compass rhyme used in earlier activities of the series is extended to include *north* and *south*. To simplify learning direction orientation, a song that incorporates the concepts in the rhyme is introduced. This song is used at all levels of DASH.

Game

The students play a Where Would You Be? Game. The students should stand in an open area and think where they would be if they took some number of steps in various directions. They then check their prediction by pacing off the directions as instructed.

STUDENT ROLE

Wayfinder

MATERIALS

chalk
classroom signs pointing north and south
Student Page K.7.4 NORTH AND SOUTH

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PRODUCT

Completed Student Pages

PROCEDURES

1. Read the "Body Compass Rhyme," review *east* and *west*, and discuss *north* and *south*.

Body Compass Rhyme

Our body is a compass that we always can use.
With it we can find any direction we choose.

Reach out your right hand to where the sun will rise.
We find *east* where the sun is first seen by our eyes.

Let your left hand point to where the sun will set.
That's *west* out there now don't forget.

The sun goes o'erhead from the *east* to the *west*,
Before it sinks down and allows us to rest.

For *north* we just follow the tip of our nose.
It's the same direction as our north-pointing toes.

That leaves us but one direction to find,
And there is *south* located right behind.

Ask such questions as these:

- Which part of your body faces *north* when you are acting as a compass?
- Which part of your body is turned to the *south* when you are acting as a compass?
- Which direction is *north*?
✓ Point to it.
- Which direction is *south*?
✓ Point to it.

3. **Mark north and south on the classroom walls.**
4. **Introduce the *Body Compass Song* as another way to remember how to find direction.**

Body Compass Song

sung to the tune of
When Johnnie Comes Marching Home

The sun is rising in the *east*, the *east*, the *east*.
The sun is setting in the *west*, the *west*, the *west*.
My nose is *north*,
My seat is *south*,
And Earth can turn itself about.
The sun is rising in the *east* and setting in the *west*.

- Have the students use their hands and bodies to act out the song.
 - Repeat the song whenever direction is needed.
5. **Have the students play the *Where Would You Be? Game*. Use a clear space. Have the students agree to take small steps two shoe-lengths long.**

Instruct the students to do the following:

- Close your eyes. In your mind walk *north* 5 steps. Where would you be? Try it and see.
- Reset your body compass, nose *north*, seat *south*. Close your eyes. In your mind you now turn and walk *west* 5 steps. Where would you be? Try it and see.
- Reset your body compass, nose *north*, seat *south*. Close your eyes. You now turn *east* and go ahead 5 steps, then turn *north* and walk 5 steps. Where would you be? Try it and see.
✓ You may want to repeat the instructions as the students try them.
- Add other directions or ask the students to suggest new directions.

6. Have the students take home Student Page K.7.4 NORTH AND SOUTH to complete the picture of places north and south of their homes.
-

EXTENSIONS

- Have the students make stakes with east, west, north, south signs on them. Post these when working or playing outside.
- Mark compass directions on the sidewalk in chalk.

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K.7.5 HOME LOCATION

OBJECTIVES

The students

- locate where they live on a map
- learn where their friends live
- practice using the terms *north*, *south*, *east*, and *west*

BACKGROUND

HOME LOCATION is the part of the series of activities on location and finding ones-way. It usually follows Activities K.6.21, GETTING LOST and K.7.1 RIGHT AND LEFT, K.7.2 SUNRISE, K.7.3 SUNSET, and K.7.4 NORTH AND SOUTH. It is also part of a series on mapping and usually precedes Activities K.7.9 TRAFFIC SIMULATION MAPPING and K.7.11 CLASSROOM MAPPING.

Developmental logic

Children at a very young age are able to interpret an abstract representation of their immediate world in the form of a map. DASH calls upon this inherent capacity to begin the use of maps of the area around the school. Lines on the maps representing highways and streets can be compared with the real highways and streets that the students see and travel each day. Use *east-west/north-south* directions to align the maps.

Maps

Send home a copy of a map showing the school and the area it serves. Enclose a note asking the families to work with their child and locate their home on the map. See Fig. K.7.5. Ask them to circle the approximate location and return the map with their child.

Safety

In some communities this activity may present safety concerns. **Check with your administration.**

STUDENT ROLE

Wayfinder

MATERIALS

map of local school district

PRODUCT

Class Location Map

PROCEDURES

1. **Send home a map of the local school district with the students. Ask the families to help their child locate where they live. Have the students keep this map in their Science Record Books for use again in DASH 1. See the Background for safety issues.**
2. **Put a large Class Location Map on a north wall or on a table. Orient it with *east-west* markings on the walls. Have the students put a pin in the class map to mark where they live.**

Ask such questions as these:

- Where is the school on the map?
 - Where is the *east* side of the school on the map?
 - Where are the *south*, *west*, and *north* sides of the map?
 - Who lives on the *north* side of school?
 - Who lives on the *east* side of school?
 - Who lives on the *south* side of school?
 - Who lives on the *west* side of school?
3. **Have the students stretch strings on the class map from the area where they live directly to the school.**
- Ask such questions as these:
- Who lives the closest to school? How can you tell?
 - Who lives the farthest from school? How can you tell?
 - Are there any people who live about the same distance from the school? Who are they? How can you tell?

- Are there advantages in living close to school? Farther away? What are they?
 - Are there disadvantages in living close to school? Farther away? What are they?
-

EXTENSION

- Help the students create a Distance-from-School graph with the string lengths from Procedure 3.

Dear Family:

We will shortly be studying mapping in our kindergarten class. I am enclosing a school district map with this letter. Please work with your child to locate where you live in the district. Draw a nickel-sized circle around the location of your home to help us measure distance and practice direction skills. Please send the map with the location circle back to school with your child.

On your own, you may wish to use the map to talk about routes to and from school, street names, and distances.

Thank you for your help.

Fig. K.7.5 Sample mapping note



K.7.6 SIDEWALKS AND WALKWAYS

OBJECTIVES

The students

- learn a right-side-walking rhyme
- practice the rules for right-side traffic movement

BACKGROUND

SIDEWALKS AND WALKWAYS is the second of the series of activities about safety. It usually precedes Activity K.7.1 RIGHT AND LEFT. Other activities in the series are K.7.7 ROADS, K.7.8 TRAFFIC SIMULATION EQUIPMENT, K.7.9 TRAFFIC SIMULATION MAPPING, and K.7.10 TRAFFIC SIMULATION RULES.

Walking conventions and rules

In countries where cars are driven on the right side of the road, people usually walk on the right side of sidewalks, halls, and other walkways. In the United States a right-side convention is used. In countries where people drive on the left side of the highway, the convention is reversed.

Mnemonic

SIDEWALKS AND WALKWAYS uses song to help the students remember the right-side rule.

STUDENT ROLE

Pedestrian

MATERIALS

chalk

Student Page K.7.6 RIGHT OF WAY

PRODUCT

Completed Student Pages

PROCEDURES

1. **Take the students to another part of the campus along halls or other walkways.**

Ask such questions as these:

- Does anyone know which side of the hall you should walk on when other people are also using it?
- Who can raise your right hand?
✓ Remember your right hand should be toward the wall in the hall.
- Why must you be quiet when you walk in the hall during class time?
- What is it like when other people are not quiet in the halls and you are in class?

2. **Have the students form a line at the end of a hall and then walk counterclockwise in a circle.**

Have them do the following:

- Notice that the hall walls are next to them on their right side.
- Break the circle and walk down the hall, keeping the wall on the right side.

3. **Divide the class and have the students walk toward each other, trying to pass in a narrow hall or on a sidewalk. First, have each group walk randomly. Then, have each group walk on the right side.**

Ask such questions as these:

- Which way was it easier to walk, when you walked on the right side or when you walked just as you pleased?
- Why do you think people walk on the right side of halls and sidewalks?
- Where else do people move on the right side?
✓ Include on highways when people drive cars and on streets when they ride bicycles.

4. Draw arrows pointing forward on the right side of a 20-meter stretch of sidewalk. On the opposite side of the sidewalk, draw arrows going in the opposite direction.

Have the students do the following:

- Form a line on each side of the sidewalk.
- Have the two lines walk past each other, following the arrows.
- Notice that the outside of the sidewalk is on their right side for both groups.

5. Read or sing the *Right-of-Way Song* to the students.

**RIGHT-OF-WAY
SONG**

Sung to the tune of
This Is the Way We Wash Our Clothes

We walk in the hall on the right side,
The right side, the right side.
We walk in the hall on the right side,
So no one will collide.

We walk on the sidewalk on the right side,
The right side, the right side.
We walk on the sidewalk on the right side,
So no one will collide.

We drive on the road on the right side,
The right side, the right side.
We drive on the road on the right side,
So no one will collide.

6. Help the students complete Student Page K.7.6 **RIGHT OF WAY** to use as a guide for marking direction arrows in some halls or walkways to show where they will walk.

- Select a starting point and have the students show where they will walk when they turn *right*.
 - ✓ Mark the walking side on the map with arrows.
 - ✓ Use pencil so that corrections can be made.

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- Select a starting point and have the students show where they will walk when they turn *left*. Again mark the walking side on the map with arrows.
 - Continue the walking adventure with arrows and right-and-left directions.
-

EXTENSION

- Have the students make up their own verses or aphorisms to remember walking safety rules.



K.7.7 ROADS

OBJECTIVES

The students

- learn how to walk against traffic when there is no sidewalk
- practice walking against traffic when there is no sidewalk

BACKGROUND

ROADS is part of a series of activities on safety. It is usually preceded by Activity K.7.1 RIGHT AND LEFT and K.7.6 SIDEWALKS AND WALKWAYS. Others in the series are K.7.8 TRAFFIC SIMULATION EQUIPMENT, K.7.9 TRAFFIC SIMULATION MAPPING, and K.7.10 TRAFFIC RULES.

Logic of the activity

Here the students investigate how to walk on the roadways when there are no sidewalks. Through simulation and discussion they find that by facing ongoing traffic they can see and anticipate how traffic is moving. When they are walking in the same direction that the cars are going, they cannot see cars coming up behind them

Mnemonic

A rhyme is used to remind the students to walk facing traffic when there are no sidewalks.

STUDENT ROLE

Pedestrian

MATERIALS

Chalk

Student Page K.7.7 WALKING ON THE ROADSIDE

PRODUCT

Completed Student Pages

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PROCEDURES

1. **Have the students role-play walking on roads without sidewalks. This is a good activity for outdoors. Draw roads with chalk on the playground or unused real driveways on the school grounds.**

Instruct the students as follows:

- Have half the students take the role of car drivers and half the role of pedestrians.
- Have the cars go quickly down the road on the right side and come back on the right side, making a continuous loop.
- Have all pedestrians walk slowly in the same direction on the side of the road. Pedestrians can walk on either side of the road but can't look backwards.
- Commission some "reckless drivers," who, without leaving the roadway, try to touch unsuspecting pedestrians walking on the side of the road. Allow pedestrians to jump out of the way of the touch.
- Announce that any pedestrian touched by a driver is "injured."
- Reverse roles.

2. **Summarize the activity.**

Ask such questions as these:

- Which side of the road should you walk on when there is no sidewalk? Why?
 - ✓ Review the simulation, discussing what can happen when cars come up behind pedestrians who can't see them and what can happen even when pedestrians can see the oncoming cars.
- What side of the road does the traffic move?
 - ✓ Remind the students that it moves on the right side of the road.

- When you have no sidewalks, what side should you walk on? Why?
 - ✓ From their simulation the students should see that they should walk facing traffic. To do this, they must walk on the left side of the road.
 - ✓ Get at the idea that cars and trucks can hit and hurt and even kill people.
- 3. Use Student Page K.7.7 **WALKING ON THE ROADSIDE** to have the students show how they face traffic when they are on a road without sidewalks.
- 4. Recite the "No Sidewalk Rhyme" with the students and review its meaning.

**No Sidewalk
Rhyme**

Stop and wait and look and see,
Does a sidewalk protect me?
If I find none, I must walk
With eyes as sharp as a hawk,
Facing cars that come toward me
So reckless drivers I will see.

EXTENSIONS

Make a class list of traffic situations that are particularly dangerous for pedestrians. Include such things as these:

- Narrow shoulders to walk on.
- Cars passing on narrow roads.
- Big trucks that take up a lot of roadway.
- Drivers not paying attention, using cellular phones, or eating while driving.

Add to the list when the students report particularly dangerous situations.



K.7.8 TRAFFIC SIMULATION EQUIPMENT

OPERATING OBJECTIVES

The students

- make signs and vehicles necessary for a traffic simulation
- lay out the roads, sidewalks, and other highway features of their simulation

BACKGROUND

TRAFFIC SIMULATION EQUIPMENT is part of the series about traffic and safety. It usually precedes Activities K.7.9 TRAFFIC SIMULATION MAPPING, and K.7.10 TRAFFIC SIMULATION RULES.

In this activity the students prepare for a simulation of vehicular and pedestrian traffic. They make traffic signs and vehicles for the simulation in Activity K.7.10 TRAFFIC SIMULATION RULES.

Equipment design

The students should invent their own vehicles, signs, and other devices common to streets and highways. Equipment should be made from recyclable materials such as cardboard, plastic bottles, and so forth. The students' invention may go beyond their construction capability, and they will need help.

Equipment

The simulation will usually have the following:

- 8 vehicles or more (including a fire engine, a police car, an ambulance, and a school bus)
- 6 stop signs
- 4 stoplights
- 4 crossing guard signs
- other equipment as desired (school zone signs, speed limit signs, speed bump signs, and so forth)

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Vehicles that students can fit into can be made from cardboard boxes, large shopping bags, even large paper grocery bags. Though eight vehicles will satisfy the basic needs of the simulation, many students will want to take home their creations. Thus, the number of vehicles can multiply rapidly and small vehicles may be a necessity.

Cutting cardboard

The students should be able to safely use hack saws or universal scissors. Cardboard for vehicles and signs can be cut by making a deep scratch with a nail and putting water in the scratch with a wet rag. When the cardboard is soft, it can be cut with a plastic knife or scissors. The cardboard will dry and again become rigid. The students can also draw lines on cardboard for adults or older students to use as cutting guides.

STUDENT ROLES

Automotive engineer
Traffic engineer
Manufacturer
Clothing designer

MATERIALS

shopping bags
grocery bags
corrugated cardboard
oaktag
markers
paper plates
cardboard tubes
paint
brushes
string
duct tape
masking tape
staplers
lath
universal scissors or hacksaw blades
Student Page K.7.8 TRAFFIC SIGNS

PRODUCTS

Vehicles
Simulated highway equipment
Completed Student Pages

PROCEDURES

1. **Discuss with the students the traffic simulation for which they will need to invent cars, trucks, buses, and other vehicles. Help them invent and make vehicles. Provide an Inventor's Box of materials.**

Begin with the discussion by asking such questions as these:

- What kinds of vehicles are on the highway?
✓ Get at cars, trucks, buses, police cars, fire engines, ambulance, bicycles, motorcycles, mopeds, and so forth.
- What kinds of vehicles do we want in our simulation?
✓ Make sure they include such vehicles as a fire engine, a police car, a school bus, and an ambulance, as well as cars.
- How can we make a cardboard box, shopping bag, or grocery bag into a car, bus, truck, and so forth?
✓ Discuss and encourage all ideas.

2. **Have the students invent and make vehicles. Be sure they include a fire engine, a police car, a school bus, an ambulance, as well as cars.**
3. **Discuss the need for street stop signs, traffic lights, crossing guard stop signs, and other signs and equipment.**

Begin the discussion with such questions as these:

- What kinds of signs are on the highway?
- What other kinds of things help us when we are on the highway?
✓ Get at such things as stop lights, warning lights, construction barriers, cones, and so forth.
✓ Have teams design and make at least the minimal set. See the Background.
✓ Have the students use Student Page K.7.8 TRAFFIC SIGNS to help identify signs by shape.

- How can we make these kinds of equipment?
 - What kind of people help us when we are on the highway?
 - ✓ Get at policeman, school crossing guards, road crews, ambulance drivers, firefighters, and so forth.
 - How can we identify such people in the simulation?
 - What else do we want in our simulation?
- 4. Have the students work in groups to make the equipment. Provide an Inventor's Box of materials.**
-

EXTENSIONS

- Invite other groups to come to see the simulation.
- Join with other kindergarten classes to run the simulation.



K.7.9 TRAFFIC SIMULATION MAPPING

OBJECTIVES

The students

- engineer a road system for a traffic simulation
- make a map of the road system
- lay out the roads, sidewalks, and other features for the traffic simulation

BACKGROUND

TRAFFIC SIMULATION MAPPING is part of the series about traffic and pedestrian safety. It usually follows Activities K.7.1 RIGHT AND LEFT, K.7.6 SIDEWALKS AND WALKWAYS, K.7.8 TRAFFIC SIMULATION EQUIPMENT and precedes K.7.10 TRAFFIC SIMULATION RULES. It is also part of the series about location and mapping that includes K.7.1 RIGHT AND LEFT, K.7.7 HOME LOCATION, and K.7.11 CLASSROOM MAPPING.

Logic for the activity

In TRAFFIC SIMULATION MAPPING the students engineer a road system and make a class road map that they will use in the traffic simulation in Activity K.7.10 TRAFFIC SIMULATION RULES. The simulation calls for a road with two different kinds of intersections—one with and one without sidewalks. These two intersections will be outlined on the playground, classroom floor, or elsewhere using the class road map as a guide.

Road system and map

The students first work in groups to engineer road systems. Then from the suggested designs a single design is agreed upon, and this becomes the class road map. To simplify the engineering process, have them think about designing roads for a town in the center of a small island with one road around it. See Fig. K.7.9 for one possible road system.

An approach

Have the students draw a rectangular island that fills a large sheet of paper. Have them cut out the two intersections from Student Page K.7.9

INTERSECTIONS (1-2) and place them where a town will be located. Draw a road around the island and make connections to the two intersections.

Road system and class road map

The road system can be as simple as the two intersections and the connecting island road. Alternatively, it can be a complex system with other roads, driveways, parking lots, and sidewalks. Combine ideas into a single design. Help the students name the streets, name the town, and label the design as the class road map.

Laying out roads for the simulation

At the site of the simulation have the students help lay out the roads of the town using the class road map as a guide. The simulation can be held indoors or outdoors. Lines can be drawn with chalk on asphalt or floors. Tape can be used on smooth surfaces or carpets. If the surface is grass or dirt, a football field line chalk can be used. A stick is all that is needed to draw in dirt.

Passing room

In laying out the streets and sidewalks, be sure that there is enough room for the students to pass each other when driving their vehicles or when walking. As a rule of thumb, a single lane of highway or strip of sidewalk should be about a meter or 3 ft wide.

STUDENT ROLES

Highway engineer
Surveyor

MATERIALS

chart paper
blocks or half-pint milk cartons for houses
marking pens
pencils
plastic tape
Post-it glue
line chalk (used on grassy and dirt areas)
chalk for marking concrete floors and asphalt
tape for marking tile floors and rugs
Student Page K.7.9 INTERSECTIONS (1-2)

PRODUCTS

Engineering designs

Class road map

Road layout for Activity K.7.10 TRAFFIC SIMULATIONS RULES

PROCEDURES

1. **Show the students where the traffic simulation is to be carried out. Explain that they need to engineer the road system for the traffic simulation. A class map of the roads will be made from their engineering designs and then used to lay out the roads for the simulation.**
2. **Describe the setting of the simulation—a town in the middle of a small island with one road running around it. List what needs to be included in the simulation—2 road intersections, sidewalks, roads with and without sidewalks, one or more parking lots, and other things the students wish to include.**
3. **Divide the class into engineering groups and give each group a large sheet of chart paper.**
 - Help them draw an outline of the island using most of the space on the paper.
 - Help them sketch the around the island road.
4. **Have the students look at Student Pages K.7.9 INTERSECTIONS (1-2) and explain that these two intersections will be on the island.**

Ask such questions as these:

- Which of the intersection maps shows crosswalks and sidewalks?
- Where would you find intersections with crosswalks in a town?
✓ Work for the idea that they would probably be near the center of a town.
- Where would one find intersections with no crosswalks on the island?
✓ Work for the idea that they would probably be near the edge or outside of the town.

- What markings show drivers where the middle of the street is? How is this marked on the intersection cutouts?
 - At which intersection would you most likely put stoplights?
 - At which intersection would you be more likely to put just stop signs?
5. **Have the students cut out and tentatively place the diagram of the intersections on their map. The cutouts can be held in place with a small piece of plastic tape or Post-it glue.**
 6. **Help the students work in groups to engineer their road designs.**

Help the students do the following:

 - Draw lightly in pencil connecting roads.
 - Draw in center lines on roads.
 - Add sidewalks, one or more parking lots for vehicles, and other features that the students want.
 - Darken in the lines when they are satisfied with their design.
 7. **Have the students describe their engineering designs.**
 8. **Use the students' designs to draw a class road map to be a guide in laying out the road system for the simulation. Have them name the town and roads.**
 9. **Right before the simulation, have the students help you mark intersections, sidewalks, crosswalks, and parking lots at the simulation site.**
 - In laying out the roads, be sure they are wide enough to accommodate the vehicles the students have made. Use about a meter or 3 feet for each sidewalk and highway lane.
 - Try to make parking lots large enough to hold the vehicles when they are not being used in the simulation.

EXTENSION

- Have the students make a table-top representation of the island town and its road system using milk cartons and boxes to represent buildings.

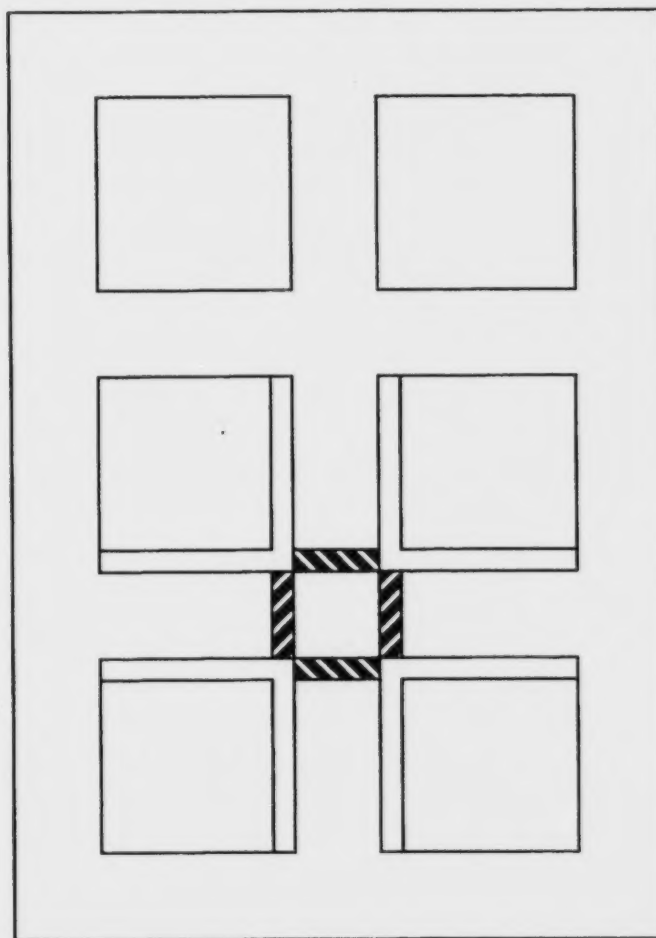


Fig. K.7.9 A possible road map for an island village



K.7.10 TRAFFIC SIMULATION RULES

OBJECTIVES

The students

- set up intersections with different kinds of traffic controls
- simulate traffic and pedestrian interaction at intersections
- practice appropriate pedestrian and driver behavior
- engineer an effective traffic system

BACKGROUND

TRAFFIC SIMULATION RULES is the culminating activity about pedestrian and car safety. Other activities in the series are Activities K.7.1 RIGHT AND LEFT, K.7.6 SIDEWALKS AND WALKWAYS, and K.7.7 ROADS, K.7.8 TRAFFIC SIMULATION EQUIPMENT, and K.7.9 TRAFFIC SIMULATION MAPPING.

Logic for the activity

In TRAFFIC SIMULATION RULES the students carry out a series of simulations involving vehicles and pedestrians and then reflect on safety. They use vehicles, signs, and other items associated with pedestrian and vehicular travel made in Activity K.7.8 TRAFFIC SIMULATION EQUIPMENT. Directions for the laying out of town streets, sidewalks and parking lots are found Activity K.7.9 TRAFFIC SIMULATION MAPPING.

Intersections

Eight different traffic intersections are suggested. See Figs K.7.12(1-8). Each intersection provides pedestrians and drives with a different set of problems.

Problems simulations

The objective of the simulation at each intersection is to get pedestrians safely across the street. Other road and traffic hazards that students may confront locally such as a railroad crossing, bus stops, and so forth can be added. Though the correct behavior of drivers is important to the effectiveness of the simulation, driving is not the primary focus of the simulation.

It may not be possible to complete all the simulations. If this is so, the class road map made in Activity K.7.10 can be used to set up situations that students can discuss.

Student roles in the simulation

Ideally all students should have an opportunity to play the roles of pedestrians, vehicle drivers, and traffic engineers. As traffic engineers they are looking to see what can be improved in the way students behave as pedestrians, drivers, and crossing guards and the way the lights and other equipment work. At the end of each simulation have the engineers report on what they have observed, suggesting ideas for improving the traffic system of the town.

Give each engineer a clipboard and Student Page K.7.10 to keep records. Records can be drawings or any other forms of recording that help remind the students of things they wish to talk about later.

STUDENT ROLES

Traffic engineer
Driver
Pedestrian
Crossing guard
Police

MATERIALS

whistles
clipboard for engineers to hold their observation sheets
(a cardboard sheet and Bulldog Clamps to hold paper can be used)
equipment built in Activity K.7.8 TRAFFIC SIMULATIONS EQUIPMENT
class road map from Activity K.7.9 TRAFFIC SIMULATION MAPPING
Student Page K.7.10 TRAFFIC ENGINEER'S REPORT

PRODUCT

Simulations
Completed Student Pages

PROCEDURES

1. **Review the meaning of lines that mark roads, center lines, sidewalks, parking lots, and so forth.**

2. **Prepare for Traffic Simulation Problem Set 1 using Intersection 1. See Figure K.7.10(1). Intersection 1 has 4 crosswalks, 4 stop signs, and 2 crossing guards.**

Ask such questions as these:

- What does the crossing guard do?
- When does the crossing guard start to work?
- What must pedestrians do when there is a crossing guard at an intersection?
- Which way do pedestrians look when starting to cross a street?
✓ This is a critical question. Have the students practice always looking *left* first then *right* since the immediate danger usually comes from the left in countries where drivers drive on the right side of the road. The direction of where to look is reversed where driving is on the left side of the road.
- What must cars do when there is a crossing guard?
✓ Help the students recall that the cars are supposed to stop when guards put out their stop sign.
- When do pedestrians walk into a crosswalk attended by a crossing guard?
✓ Help the students recall that the pedestrians move only when the crossing guard says to *go*.
- Which side of the sidewalk do pedestrians walk on as they approach each other?
✓ Recall the rhyme about walking on the right side from Activity K.7.6.
- When you practice using a crosswalk, what observations should traffic engineers make?
✓ Get at the things that go right and wrong.

3. **Have the students play different roles, including those of pedestrians, crossing guards, vehicle drivers, and the traffic engineers with their recording clipboards and Student Page K.7.10 TRAFFIC ENGINEER'S REPORT.**

4. **Have the traffic engineers report their observations.**

Ask such questions as these:

- What did the pedestrians do that was *right*? The drivers? The crossing guards?

- What did the pedestrians do that was *not right*? The drivers? The crossing guards?
 - How can each improve next time?
- 5. Prepare for Traffic Simulation Problem Set 2 using Intersection 2. See Fig. K.7.10(2). Change the layout so the intersection has 4 crosswalks, 4 stop signs, and no crossing guards.**
- Ask such questions as these:
- What is the difference between this and Intersection 1?
 - ✓ They are the same except there are no crossing guards here.
 - When do pedestrians move now?
 - ✓ The pedestrians move in response to the presence of cars. The pedestrians are responsible for their own safety.
 - Which way do pedestrians look when they cross the street?
 - ✓ Review the need to look left first, then right and not to cross if cars are near by.
 - What do cars do?
 - ✓ Get at the laws that regulate cars and pedestrians who are in the crosswalk.
 - ✓ Note that pedestrians must always be wary since not all drivers are careful.
- 6. Have the students play different roles, including those of pedestrians, vehicle drivers, and traffic engineers.**
- 7. Have the traffic engineers report on their observations.**
- 8. Change intersections successively using Figs. 3-8. Discuss the changes made with each new intersection. Ask similar questions to those found in Procedures 4 and 5. Discuss the functions of signs and lights and the responsibilities of pedestrians and drivers. Carry out the simulations and have the traffic engineers make their reports after each one.**
- Intersection 3 is the same as Intersection 2 but with no sidewalks. It has 4 stop signs. See Fig. K.7.10(3).
 - ✓ If two intersections have been laid out as suggested in Activity K.7.9, use the other intersection.

- Intersection 4 is the same as Intersection 1 with sidewalks, 4 stoplights, and 2 guards. See Fig. K.7.10(4).
- Intersection 5 is the same as Intersection 1 with sidewalks, 4 stoplights, and no crossing guards. See Fig. K.7.10(5).
- Intersection 6 is the same as Intersection 1 with sidewalks, 2 stop signs, and no lights or crossing guards. See Fig. K.7.10(6).
- Intersection 7 is the same as Intersection 3 with no sidewalks and 2 stop signs. See Fig. K.7.10(7).
- Intersection 8 is the same as Intersection 3 with no sidewalks and no stop signs. See Fig. K.7.10(8).

9. Help the students invent other traffic situations.

Include such situations as these:

- Using two intersections at the same time, one with sidewalks the other with out.
✓ This will require considerable invention on the part of students to coordinate operations.
- Walking on the highway without sidewalks.
- Walking in front of a driveway.
- Chasing a ball that has gone into the street.
- Crossing the road where there are no stop signs or signals.
- Riding a bicycle where there is a bicycle lane.
- Riding a bicycle where there is no bicycle lane.

10. Help the student discuss what they have done in the simulation. Relate the simulation to their daily world of traffic or their experience when they are in a city.

EXTENSIONS

- Give out good driver and good pedestrian awards for appropriate practices as drivers and pedestrians.
- Give outstanding engineering awards for insightful observations.

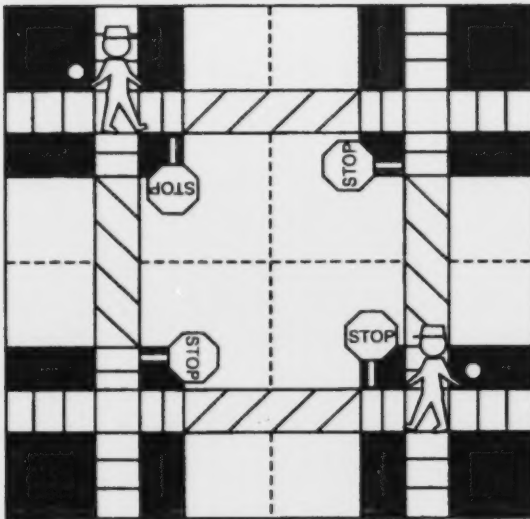


Figure K.7.10(1) Traffic simulation Intersection 1

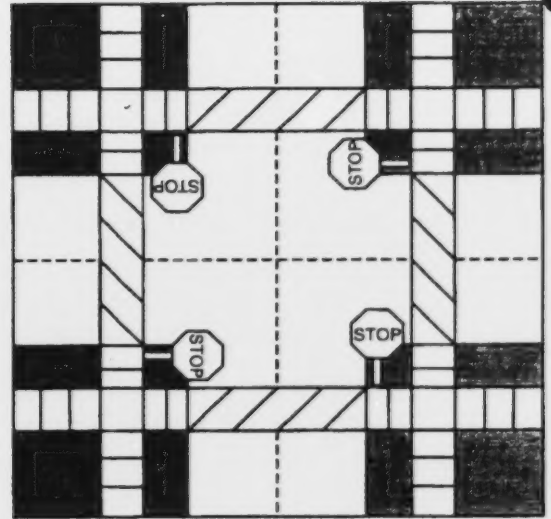


Figure K.7.10(2) Traffic simulation Intersection 2

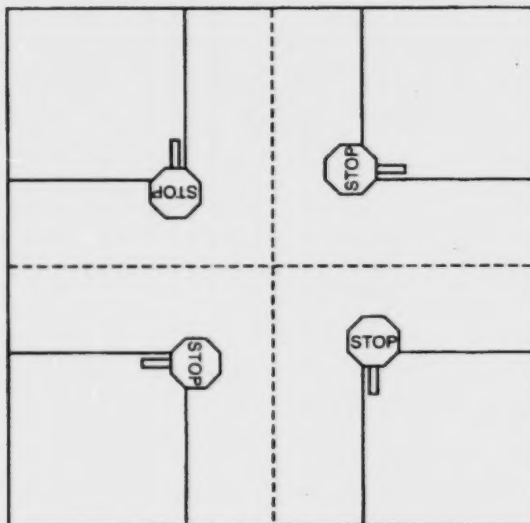


Figure K.7.10(3) Traffic simulation Intersection 3

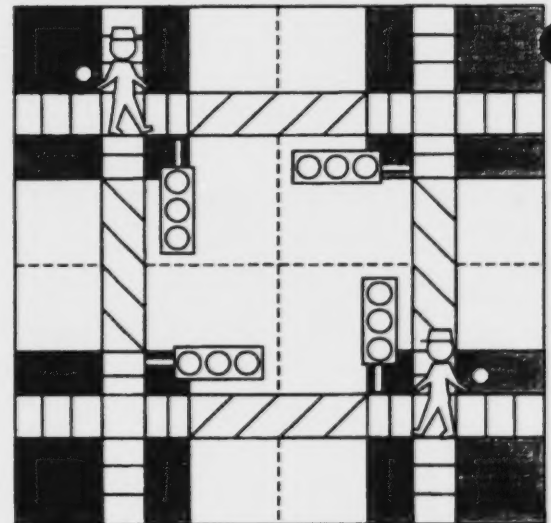


Figure K.7.10(4) Traffic simulation Intersection 4

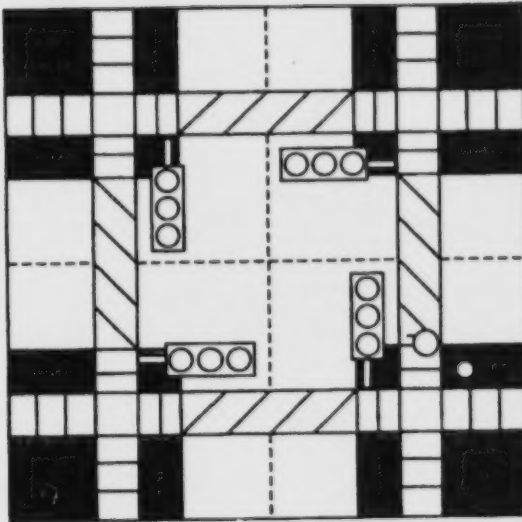


Figure K.7.10(5) Traffic simulation Intersection 5

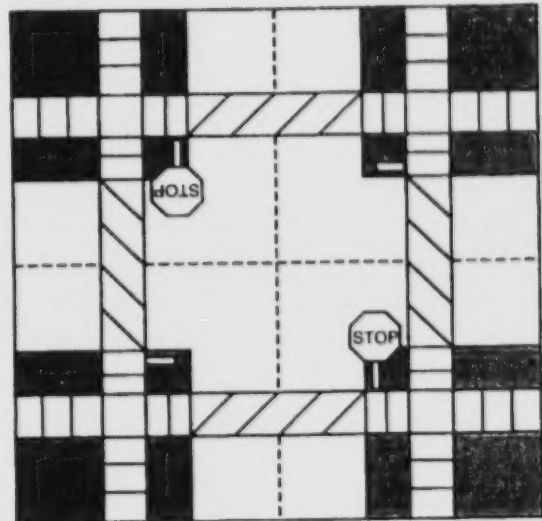


Figure K.7.10(6) Traffic simulation Intersection 6

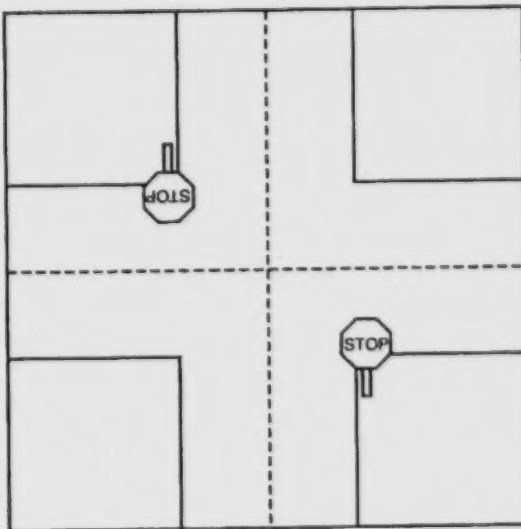


Figure K.7.10(7) Traffic simulation Intersection 7

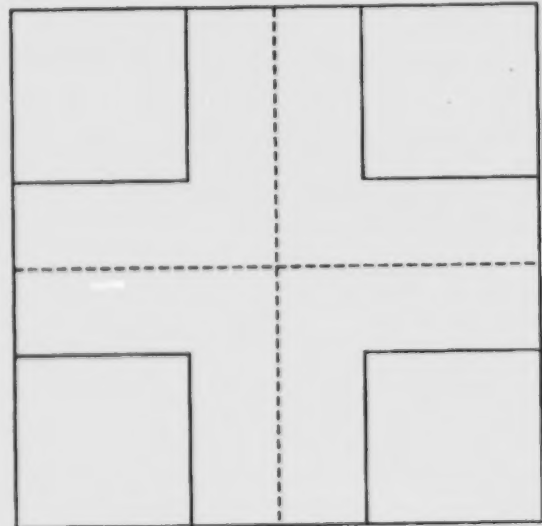


Figure K.7.10(8) Traffic simulation Intersection 8



K.7.11 CLASSROOM MAPPING

OBJECTIVES

The students

- draw a floor plan or map of the classroom for relocation of furniture

BACKGROUND

CLASSROOM MAPPING is part of the series on location and mapping. It is usually preceded by Activities K.7.1 RIGHT AND LEFT, K.7.7 HOME LOCATION, and K.7.9 TRAFFIC SIMULATION MAPPING.

Logic for the Activity

In Activity K.7.9 TRAFFIC SIMULATION MAPPING the students made a small map that became the guide to making the large road system of the simulation. In CLASSROOM MAPPING the students reverse the process and produce a small map of their much larger classroom. A builder or architect would call their product a *floor plan*. To bring attention to the process of drawing an outline of the locations of things as seen from above, we again use the term *map*.

This activity extends the concepts and skills of mapping. It applies the ideas of location to picturing large things on small pieces of paper. Don't be concerned about drawing to scale at this time. Focus on the general location of objects on the map.

When to use

A logical motivation for mapping is provided when the students are going to help change the arrangement of furniture in the room.

Room template

If students' drawing skills are not well developed, make several cardboard templates of the shape of the room that will fit on Student Page K.7.11B CLASSROOM MAP. The students can trace around these so that they will have similar boundaries for their floor plans.

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STUDENT ROLE

Architect

MATERIALS

chart paper
pencils
markers or crayons
scissors
blocks of colored paper about 2 x 3 in. to represent books
blocks of colored paper cut to represent tables (proportional to table size)
Post-it glue
cardboard room templates
Student Pages K.7.11A MAPPING
K.7.11B CLASSROOM MAP

PRODUCTS

Classroom map
Completed Student Pages

PROCEDURES

1. **Share and discuss different examples of maps with the students.**

Ask such questions as these:

- What maps have you used before?
- How did you use these maps?
- What is a map?
✓ Get at the idea that it is an outline of a place seen when you look down on it. It could be smaller, the same size, or larger.
✓ Show examples.

2. **Review the idea of drawing a map by mapping books on chart paper.**

- Put a large piece of paper on the floor so everyone can see it and place 3 or 4 books on it.
- Trace around the books.

- Remove the objects and announce that you have made a "life size" map. Discuss what the map tells us.
 - Replace the books on the sheet and work for agreement that the map tells us where things are and something about their shapes and relative size.
- 3. Give the students Post-it glue and blocks of colored paper of the same size to represent the books. Have them use Student Page K.7.11A MAPPING to make their own smaller copy of the map of the books made in Procedure 2.**
- When the students are satisfied with their alignment of their paper books, have them compare their representations with their classmates' and with the original layout of books on chart paper.
 - Help them realign their "paper books" as necessary and trace around them in pencil.
 - Remove the paper books and compare their maps.
 - ✓ Discuss how they are all seeing about the same thing. They have the same picture or map of the books on their chart paper, only smaller.
- 4. Introduce the idea of drawing a classroom map or floor plan. Create a class map with the students and have them make their own copy.**
- Attach chart paper to the board and draw an outline of the classroom.
 - Have the students use the templates of the room's shape and trace them on Student Page K.7.11B CLASSROOM MAP.
 - Help the students identify important objects around the walls of the classroom—doors, windows, chalkboards, shelves, and so forth.
 - Have various students locate and draw these things on the chart-paper map.
 - ✓ Create logos for different objects—swinging doors, lines across walls for windows, and so forth.

- Have the students locate and draw the same things on their individual maps in pencil.
✓ Have them compare their maps and make adjustments as needed.
 - Announce that they have made room-planning maps.
- 5. Give the students Post-it glue and blocks of colored paper approximately proportionally the size of tables. Have them glue desk or tables representations on their planning map to show the arrangement of furniture in the room.**
- Have them compare maps.
 - Check the number of desks and tables represented and their location.
- 6. Help the students use their personal planning maps to think about different arrangements of desks and tables as changes are needed. Their suggestions can be reconciled on the larger room planning map.**
-

EXTENSIONS

- Have the students build a block village and map it by tracing the blocks. Remove the blocks and then reconstruct the village from the map.
- Have the students map their bedrooms.



**THE RIGHT-AND-
LEFT GAME**
SP K.7.1

Name _____

Date _____

1. Team 1 secretly chooses a lettered square and writes the letter on a piece of paper.
2. Team 2 starts on the star square.
3. Team 1 gives directions using the directions UP, DOWN, RIGHT, and LEFT one square at a time until Team 2 reaches the chosen letter square.
4. Teams reverse roles.

UP				
A	B	C	D	E
F	G	H	I	J
K	L	★	M	N
O	P	Q	R	S
T	U	V	W	X
DOWN				



EAST: SUNRISE
SP K.7.2

Name _____

Date _____

Draw pictures of some places and things that are on the **EAST** or **SUNRISE** side of your house or apartment.



FRONT DOOR



WEST: SUNSET
SP K.7.3

Name _____

Date _____

Draw pictures of some places and things that are on the **WEST** or **SUNSET** side of your house or apartment.



FRONT DOOR



**NORTH AND
SOUTH
SP K.7.4**

Name _____

Date _____

Draw pictures of some places and things that are
NORTH and **SOUTH** of your house or apartment.



FRONT DOOR

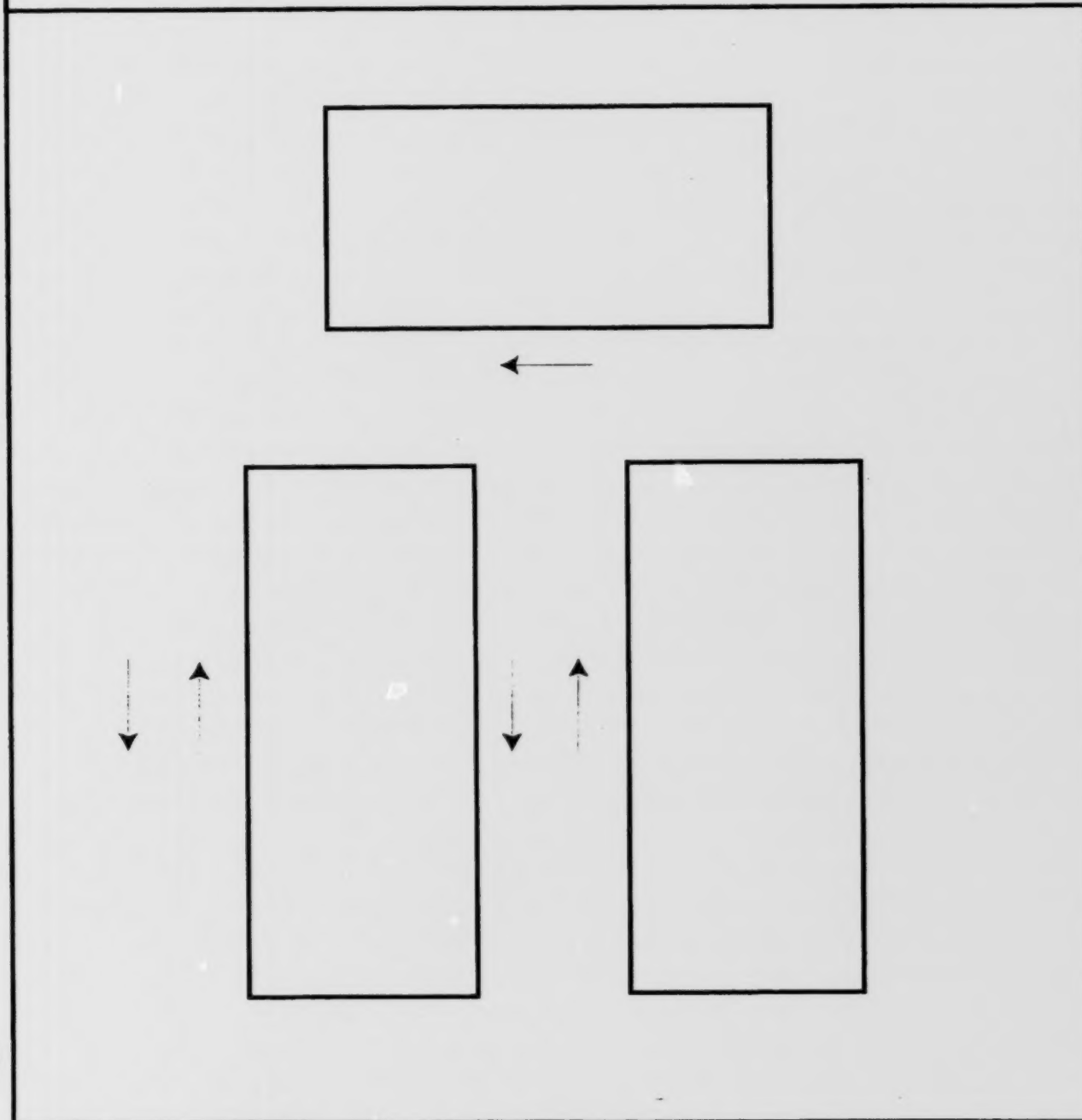


RIGHT OF WAY
SP K.7.6

Name _____

Date _____

Use arrows to show where we walk.





**WALKING ON THE
ROADSIDE
SP K.7.7**

Name _____

Date _____

Draw a picture of what you see when you face traffic.

**TRAFFIC SIGNS**
SP K.7.8

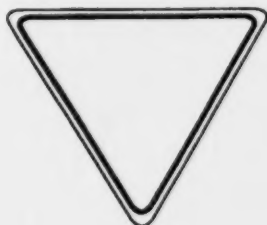
Name _____

Date _____

Match the sign shapes to the words.



No Right Turn



One Way



Stop



Yield



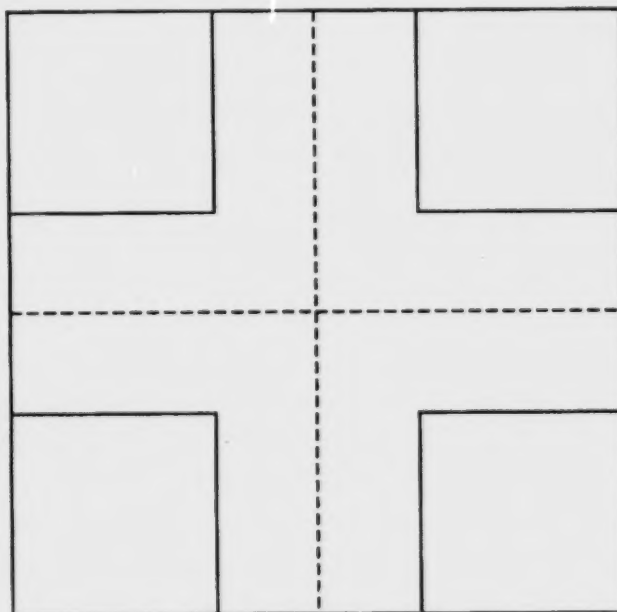
Crosswalk



INTERSECTIONS
SP K.7.9
Page 1

Name _____

Date _____

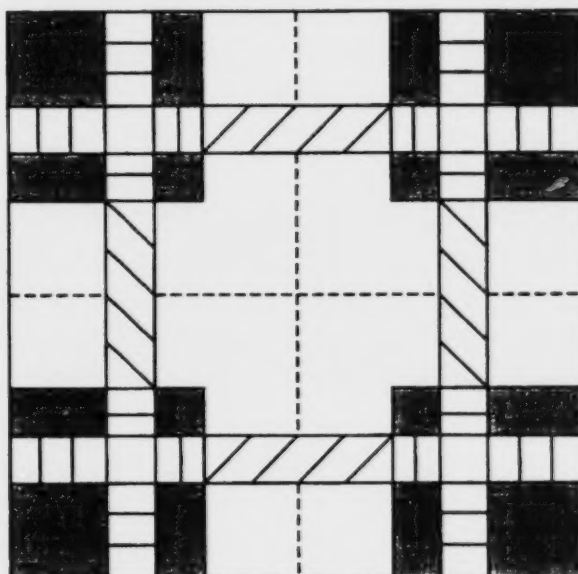




INTERSECTIONS
SP K.7.9
Page 2

Name _____

Date _____





**TRAFFIC
ENGINEER'S REPORT
SP K.7.10**

Name _____

Date _____

Things I saw that were good

Things I saw that need fixing

**MAPPING**
SP K.7.11A

Name _____

Date _____

Draw a map of objects.

**MAPPING**
SP K.7.11B

Name _____

Date _____

Make a planning map for classroom organization.



**KINDERGARTEN
CLUSTER 8**

Energy and Communication

- | | |
|-------|------------------------------|
| K.8.1 | Energy |
| K.8.2 | Making Things Move |
| K.8.3 | Making Things Stop |
| K.8.4 | Turning Things Off |
| K.8.5 | Turning Things On |
| K.8.6 | Repair and Other Maintenance |



K.8.1 ENERGY

OBJECTIVES

The students

- make a concept map about energy
- use a mnemonic as a starting definition for energy
- identify things that are warm (glow)
- identify things that move (go)
- identify things that get bigger (grow)

BACKGROUND

ENERGY is the first activity in a seven-year study of energy. It usually follows Activity K.3.4 LIVING AND NOT-LIVING. Others in the kindergarten series are K.8.2 MAKING THINGS MOVE, K.8.3 MAKING THINGS STOP, K.8.4 TURNING THINGS OFF, K.8.5 TURNING THINGS ON, and K.8.6 REPAIRING THINGS.

Logic of the activity

This activity introduces the concept of energy followed by a series of games. The games are built around a rhyme with which the students associate the term *energy* with movement (*to go*), with heat and light (*to glow*), and with growth (*to grow*). The terms *go*, *glow*, and *grow* provide the first language to begin defining energy.

Concept of energy

Energy is a difficult concept to introduce to young students because energy comes in many different forms. These forms do not appear to be like each other. For example, we have *nuclear energy*, *chemical energy*, *heat energy*, *mechanical energy*, *electrical energy*, and *light energy*, all of which are so different that we give them different names.

There is however, a common property—all forms can be converted to the other forms of energy. For example, light can be used by plants to produce wood. Wood can be burned beneath a boiler to produce heat energy. Heat energy can be converted in a steam engine to mechanical energy, which can be converted in a generator to produce electrical energy, which in turn can be converted back into light energy in a light bulb.

STUDENT ROLE

Demonstrator

MATERIALS

chart paper

markers

Student Page K.8.1 GO, GROW, AND GLOW

PRODUCTS

Concept map about energy

Completed Student Pages

PROCEDURES

1. **Help the students make a pictorial concept map of what they know about energy.**

Ask such questions as these:

- Does anyone know what energy is?
- Have you ever had anyone say that you are full of energy?
- Do you know what they meant?
- What does energy do for you?

2. **Read the "Go, Grow, and Glow Rhyme" aloud.**

Go, Grow, and Glow Rhyme

Energy is what makes things *go*.
Energy is what makes things *glow*.
Energy is what makes things *grow*.

Energy is in everything that *goes*.
Energy is in everything that *glows*.
Energy is in everything that *grows*.

3. **Game 1. Have groups of students pretend they are something that is moving or has energy of motion (*goes*). Have the class guess what the thing is. Start by pantomiming a moving truck, a moving frog, and the like.**

4. **Summarize the pretending.**

Ask such questions as these:

- Can things that are not-living move? Can they *go*?
- What are some examples of not-living things that can *go*?
✓ Cars, trucks, planes, rivers, waves, earthquakes all have movement or *go*.
- Do things that are not-living have energy?
✓ Work to consensus that they can.
- Can living things move? Can they *go*?
- What are some examples?
- Do living things have energy?
✓ Work to get consensus that they do.

5. **Game 2. Have groups of students pretend they are something that changes its size (*grows*). Have the class guess what the thing is. Start by pantomiming a growing bean seed, a glass being filled with water, or similar other.**

6. **Summarize the pretending.**

Ask such questions as these:

- Can things that are not-living get bigger? Can they *grow*?
- What are some examples?
✓ Get at such examples of not-living things that *grow* as growing pools of water in a rainstorm, growing drifts of snow, and growing sand dunes on a beach.
- To get bigger, do not-living things have energy?
✓ Work toward consensus that they do.
- Can living things get bigger? Can they *grow*?

- What are some examples?
 - As they are getting bigger, do living things have energy?
✓ Work toward consensus that they do.
7. **Game 3. Have groups of students pretend they are something that gets warm or gives off light (*glows*). Have the class guess what the thing is. Start by pantomiming the sun glowing in the sky, a cuddly dog, or other.**
8. **Summarize the pretending.**
- Ask such questions as these:
- Can things that are not-living get warm or give off light? Can they *glow*?
 - What are some examples?
✓ Get at examples of not-living things that glow such as fires, electric light bulbs, hot stoves, and so forth.
 - As they *glow*, do not-living things have energy?
✓ Work to get consensus that they do.
 - Can living things get warm?
 - What are examples?
 - Do living things have energy of warmth?
✓ Work toward consensus that they do.
9. **Have the students complete Student Page K.8.1 GO, GROW, and GLOW. Have them draw or paste in pictures from magazines of things that *go*, *grow*, and *glow*.**
10. **Have the students add to their concept map about energy.**

EXTENSION

- Make a wall display of the student pages showing things that produce energy.



K.8.2 MAKING THINGS MOVE

OBJECTIVES

The students

- identify different ways to move objects
- build the association of movement with energy

BACKGROUND

MAKING THINGS MOVE is part of a series on energy and mechanical and electrical devices. It is designed to follow Activity K.8.1 ENERGY and precede K.8.3 MAKING THINGS STOP. Other activities in the series are K.8.4 TURNING THINGS OFF, K.8.5 TURNING THINGS ON, and K.8.6 REPAIRING THINGS.

A game format is used to continue to build the idea that one form of energy involves movement. This activity develops an inventory of ways that things can be made to move. It also begins to develop the idea that energy can be passed or transmitted from one thing to another.

STUDENT ROLES

Inventor
Engineer

MATERIALS

chart paper
small objects (balls)
mechanical device (fan, clock)
Student Page K.8.2 MAKING THINGS MOVE

PRODUCTS

List of things that can be moved
Completed Student Pages

PROCEDURES

1. Review the idea of energy with the students.

- What did we say energy is?
- What was our rhyme?
 - ✓ Review the energy rhyme. See Activity K.8.1 ENERGY.

2. Describe Game 1 to the class. Successively the students are to move a small object in a way that is different from the ways others have moved it.

- Ask how can you make this (ball, wad of paper, box, and so forth) move?
- Have each student move the object in a different way.
 - ✓ No repeats allowed.
 - ✓ Example: Give the students a ball. Have them throw the ball, kick the ball, lift the ball, push the ball, pull the ball, hit the ball with a stick, spin the ball, roll the ball downhill, and so forth.
- Use chart paper and list the ways the object was moved.

3. Summarize the activity with questions.

Ask such questions as these:

- How many ways did you move the object?
 - ✓ Go over the list.
- Which ways moved it the farthest?
- Which ways barely move it?
- What did you say energy is?
 - ✓ Review the idea that energy makes things *go* or move, *glow* with warmth or light, or *grow*.
- Have you made things *go* or move?
- Did the things have energy when they moved?
 - ✓ Work to the idea that anything that moves has energy.

- How did you make things *go* or move?
 - ✓ Work to the idea that they moved themselves or moved another thing to make the object *go* or move.
 - Did you have energy?
 - ✓ Work to the idea that since they had to move they had to have energy because energy is in everything that moves.
- 4. Describe Game 2 to the class. They are to show ways of moving a mechanical device. Ask, How can you get this (fan, clock, or other) to move?**
- Each student moves or tells about moving the object in different ways.
 - ✓ No repeats allowed.
 - ✓ Example: Give the students an electric fan. One can physically move a fan in all the ways that one can move a ball. In addition one can turn on a fan, speed it up, slow it down, and so forth.
 - Use chart paper and list the ways the mechanical devices were moved.
- 5. Summarize Game 2 with questions.**
- Ask such questions as these:
- How many different ways did you move this device?
 - ✓ Go over the list.
 - What did you say energy is?
 - ✓ Work to the idea that energy is what makes something *go* and energy is in things that *go*.
 - Have you moved the object? Have you given the object energy? How?
- 6. Describe Game 3 to the class. The students are to tell how they would move large objects. This is a brain game. Ask, How can you get a (house, school, sandbox, or other large thing) to move?**

- Have the students in turn tell about different ways to move the object.
✓ Example: A house can be picked up by a hurricane, carried away in a flood, knocked down by an earthquake, leveled by a bulldozer, and so forth.
- Use chart paper and list the ways large objects were moved.

7. Summarize Game 3 with questions.

Ask such questions as these:

- How many different ways did you think of to move the large objects?
✓ Go over the list.
- What kinds of things does it take to move these objects?
- What did you say energy is?

EXTENSION

- Have the students play additional rounds of the game using different objects of their choosing.



K.8.3 MAKING THINGS STOP

OBJECTIVES

The students

- build a device to investigate collisions
- observe the effects of collisions on a machine

BACKGROUND

MAKING THINGS STOP is one of the activities about energy and the operation of mechanical and electrical devices. It usually follows K.8.1 ENERGY and K.8.2 MAKING THINGS MOVE. Other activities in the series are K.8.4 TURNING THINGS OFF, K.8.5 TURNING THINGS ON, and K.8.6 REPAIRING THINGS.

In MAKING THINGS STOP the students reverse the process of movement. They make a device that can stop a similar device or is stopped when it is dropped to the floor.

Materials

Any snug-fitting, interlocking building blocks of the Lego type will work.

Contest format

This is a contest. The students build rammers with a set number of blocks (8-12). They are instructed to make the strongest possible rammer they can so that when it is dropped from increasing heights or it rams into another, it does not break apart.

Rebuilding

The students should be encouraged to modify their rammers after each collision or fall. Like all engineers they learn from their tests. They should then reenter their models in the contest. This will initiate thinking about the need to make equipment that can stand up under physical punishment. It also makes for lots of winners.

The contests

For floor impact:

- drop the rammers from successively greater heights
- the rammer that falls from the greatest height without sustaining damage is the winner

For collisions:

- mark off separation lines on the floor 5 ft apart
- have two students shove their rammers at each other to make a collision
- the rammer that sustains the least damage is the winner of the bout

STUDENT ROLES

Inventor
Designer
Test engineer
Safety engineer

MATERIALS

Lego-type building blocks
Student Pages K.8.3 RAMMERS

PRODUCTS

rammers
Completed Student Pages

PROCEDURES

1. **Describe the contest to the students. Explain that now that they know how to move objects, they are going to study what happens when they stop objects.**
 - They are to build rammers that will collide with each other or the floor after falling from some height.
 - The engineering task is to build a rammer that is least damaged in the collision.
✓ Specify how many (8-12) Lego-type interlocking blocks they are to use. The students should all use the same number of blocks in their device.

- 2. Run the contest. Have students use Student Page K.8.3 RAMMERS to keep a record of the contests. After the students modify their rammers, have them run the contest again.**

After each collision ask such questions as these:

- Did a rammer break apart?
- Did rammers collide with each other or with the floor head-on?
- Are there differences in construction that seem to favor one rammer over another? What are they?

- 3. Summarize the contest with the students.**

Ask such questions as these:

- When rammers collide with each other or the floor, what happens?
 - ✓ Get at such things as they may stop abruptly, may be knocked backward, may fly off at an angle or may come apart.
- When cars run into each other or strike an object, what happens to them?
 - ✓ Get at such things as they may stop abruptly; one may knock another backward, may fly off at an angle, or may lose parts or otherwise break.
- When you run into things, what happens to you?
 - ✓ Get at such things as they may simply stop, may be knocked backward, may fly off at an angle, or may even break bones or get cut.
- How can you modify your rammer? How could you make one that is even less likely to fly apart on collision?
- Did the rammers have energy when they were moving?
 - ✓ Work to the consensus that they did.
- Where did the energy come from?
 - ✓ Work for consensus that the students put the energy into the rammers with the movement of their arms or it came from pull of gravity.
 - ✓ Use the term *gravity* as an unexplained downward pull on the rammers.
- How does moving energy get into things?
 - ✓ Work to the consensus that it comes from something else.

- What seemed to happen to the energy you or gravity put into the car.
 - ✓ Get at the observation that the rammers stopped each other, changed direction, or broke apart.

4. Revisit the concept map about energy and make additions.

EXTENSION

- Have the students invent ways to protect the rammer in collisions by adding padding, bumpers, better securing the pieces, and so forth.



K.8.4 TURNING THINGS OFF

OBJECTIVES

The students

- tell why electricity and water should be turned off
- practice turning things off safely

BACKGROUND

TURNING THINGS OFF is an activity in a series about energy and the operation of electrical and mechanical devices. It can be done concurrently with Activity K.8.5 TURNING THINGS ON. Other activities in the series are K.8.1 ENERGY, K.8.2 MAKING THINGS MOVE, K.8.3 MAKING THINGS STOP, and K.8.6 REPAIRING THINGS.

Logic for the activity

This activity is a companion to Activity K.8.5 TURNING THINGS ON. Many students come to school knowing little about how to turn off light switches or other electrical devices and how to fully turn off faucets. In this activity the students are introduced to turning off electricity and water and discuss why they should be turned off. Knowing when and how to turn off electricity and water is important for both safety and conservation.

When to introduce

Introduce and practice turning off electricity in the context of regulating the light in the room, the need to unplug electrical cords, and the need to turn off water used at sinks. These operations can be introduced early in the year to encourage conservation. If there is a water shortage during the school year, use this as an additional opportunity to reinforce the idea of conservation.

STUDENT ROLES

Conservationist
User of utilities

MATERIALS

Student Page K.8.4 TURNING THINGS OFF

PRODUCT

Completed Student Pages

PROCEDURES

1. **Introduce turning off electricity on some occasion when it is reasonable to turn off the lights in the classroom.**

Ask questions such as these:

- Does anyone know how to turn off the lights? Can you show us how?
- How do you know which way to move the switch?
✓ Work to the response that it is opposite to the way the switch is moved when the lights are on.
- Does the switch tell us how to turn off the lights?
✓ Work toward the response that a switch often is marked *off* and *on*.
- What does *o-f-f* spell? What does the other part of the switch say?
- When should you turn off the lights?
- Why should you turn off the lights?
✓ Work toward the idea of conservation or saving of electricity or energy.
- Are there times when you don't want to turn off the lights when you leave the room?
- Does anyone know the meaning of *conservation*?
✓ Develop the idea of not wasting things such as water and energy.
- How does turning off the light save energy?
✓ Work toward the idea that when we turn on a light, the bulb *glows*. When we turn off the light it does not *glow*. There is no energy—energy is being saved.

- What other kinds of electrical switches have you seen besides wall switches?
✓ List such things as pull chains, twist switches, push buttons, and so forth.
 - How do you turn these off?
 - Why is it dangerous to turn off a light by pulling the cord on a plug?
✓ Work toward the response that pulling the cord can weaken the wire and may eventually cause a fire if the wire begins to break.
 - How does one properly unplug an electrical cord?
✓ Work toward holding the plug and pulling on it.
- 2. Have the students practice turning off the lights, other electrical switches, and unplugging electrical cords.**
- 3. Introduce turning off water when students are using a sink or faucets in the lavatory or classroom.**

Ask questions such as these:

- Does anyone know which way to turn off the water? Can you show us how?
- How do you know how to turn the handle?
✓ Work toward the answer that if more water comes out of the faucet, you are turning the handle the wrong way.
- When should you stop turning the handle?
✓ Work toward the idea that you can stop when the water stops dripping.
- Do you always turn a faucet the same direction to turn it off?
✓ This an interesting inquiry for home research.
- Have you ever turned the water off only to find that it still dripped? Why might this happen?
- What should you do when you can't completely turn off the water?
✓ Work toward the idea of telling an adult so the leak can be repaired.
- When should you turn off the water?
✓ Work toward the idea of when you are not using it.

- Why should you turn off the water?
 - ✓ Work toward the ideas of conservation of water and saving money.
 - How do you conserve water?
 - When there is a drought, why is it especially important to conserve water?
 - ✓ Work toward the idea of having enough water to do all the things water is needed for.
 - How is turning off electricity like turning off water?
 - ✓ Get at the idea that you can control the use of water and electricity by turning off water and electricity.
 - ✓ Get at the idea that you can save energy and money by turning off water and electricity.
4. **Have the students practice turning off the water.**
 5. **Have the students list the kinds of things that they know how to turn off safely. Have them use Student Page K.8.04 TURNING THINGS OFF.**

EXTENSIONS

- Have the students observe the custodial staff repair a leaky faucet.
- Have the students collect and measure the water from a leaky faucet for an hour to see how much is lost.



K.8.5 TURNING THINGS ON

OBJECTIVES

The students

- describe why things should be turned on
- practice turning things on safely

BACKGROUND

TURNING THINGS ON is an activity in a series devoted to the study of energy and the operation of mechanical and electrical devices. It is usually done concurrently with Activity K.8.4 TURNING THINGS OFF. Other activities in the series are K.8.1 ENERGY, K.8.2 MAKING THINGS MOVE, K.8.3 MAKING THINGS STOP, and K.8.6 REPAIRING THINGS.

Logic for the activity

This activity is a companion to Activity K.8.4 TURNING THINGS OFF. Here the students are introduced to turning on electricity and water. Knowing when and how to turn them on is important for reasons of safety and conservation.

When to start

Introduce and practice turning on electricity in the context of regulating the light in the room and plugging in electrical cords. Introduce the activity by turning water on at the sink. This is usually be done early in the school year.

STUDENT ROLES

Conservationist
User of utilities

MATERIALS

Student Page K.8.5 ON AND OFF

PRODUCT

Completed Student Pages

PROCEDURES

1. Introduce the turning on of electricity whenever light is needed.

Ask questions such as these:

- Does anyone know how to turn on the lights? Can you show us how?
- How do you know which way to move the switch?
✓ Work toward the response that it is opposite to the way the switch is moved when the lights are off.
- Does the switch tell us how to turn on the lights?
✓ Work toward the fact that some switches are labeled *on* or *off*.
- What does *o-n* spell? What does the word on the switch say?
- When should you turn on the lights?
✓ Get at the idea that you need light to see what you are doing.
- Are there times when you don't need to turn on the lights?
✓ Get at the idea that they don't need to turn on the lights when they all can see well without them.
- What do you mean when you say that you use energy when you turn on a light?
✓ Get at such ideas as when lights go on they produce light energy. That energy comes from the electricity you control at the switch so you say you use energy when the light is on.
- How does one control electricity with an electric light cord?
✓ Get at plugging it in.
- How does one safely plug in a cord?
- What are some other things we control with an electrical switch?

2. **Have the students practice safely turning on the lights and other devices and plugging in cords.**
3. **Introduce turning on water when the students are using sinks or faucets in the lavatory or classroom.**

Ask such questions as these:

- How do you know which way to turn the handle?
 - ✓ Work toward the response that you turn it in the direction that produces water.
 - Do all faucets turn on the same way?
 - ✓ This is an excellent question to investigate. However, without the words *clockwise* and *counterclockwise*, it is a bit difficult to communicate.
 - ✓ Have the students test to see whether all faucets turn on in the same direction.
 - ✓ Be sure they test both hot and cold water faucets where available.
 - When should you stop turning the handle when you turn water on?
 - ✓ Work toward the idea of whenever you have enough flow to do what you want to do.
 - Why don't you want to turn on more water than you need?
 - ✓ Get at the idea of conserving or saving water.
 - ✓ Review the meaning of conservation.
 - When there is a drought, why is it especially important to conserve water?
 - ✓ Work toward the idea of having enough water to do all the things that you need water for.
4. **Have the students practice turning on the water and explore how hot and cold water can be mixed to regulate temperature. Warn the students about hot water.**
 5. **Have the students use Student Page K.8.5 ON AND OFF to list things they know how to turn on and off safely.**

EXTENSIONS

- Have the students observe water that is turned on full force and water that is turned on gently. Compare the volume of gentle and full-force water flow. Have them see how much water flows in 10 seconds or while they count to ten.
- Help the students invent aphorisms about how and why to regulate water flow. Post these above the classroom sink.



K.8.6 REPAIRING THINGS

OBJECTIVES

The students

- observe repair of equipment at school
- discuss the importance of repair and other maintenance

BACKGROUND

REPAIRING THINGS is part of a series of activities devoted to the study of energy and mechanical devices. Other activities in the series are K.8.1 ENERGY, K.8.2 MAKING THINGS MOVE, K.8.3 MAKING THINGS STOP, K.8.4 TURNING THINGS OFF, and K.8.5 TURNING THINGS ON.

Logic for the activity

The students need to become aware of how things are maintained. Seeing how floors are mopped and polished, kitchen counters are washed, toilets or broken pipes are repaired, light bulbs are changed, or graffiti are cleaned or painted over can give students a profound sense of how things work and how they must be maintained if they are to continue to work and be aesthetically pleasing. Just as important, it begins to instill a respect for property.

When to start

Early in the school year begin the activity by inviting different maintenance people to tell the class what they do at the school. During the year maintenance will probably be regularly done as part of the school upkeep. Whenever possible, arrange for the students to observe what is being done.

Maintenance staff

Get to know the school maintenance and food service staffs and ask them to talk to the students about what they do. Ideally, when maintenance personnel have an interesting job, they will invite a small group of students to go along and watch, perhaps even let them help. Kindergarten is an ideal time for such impromptu excursions.

STUDENT ROLES

Maintenance person
Electrician
Plumber

MATERIALS

markers
chart paper
Student Page K.8.6 REPAIRING THINGS

PRODUCTS

Class chart about maintenance at the school
Completed Student Pages

PROCEDURES

1. **Have the students invite various maintenance people in to find out what they do. Have them prepare questions about what they want to know.**

Include such things as these:

- What do you do?
- When do you work?
- What kind of tools do you use?
- When something breaks or is dangerous, what do we do?

2. **On a day when some maintenance is being done that all the students can watch at the same time, arrange to have the students observe. Contact the maintenance staff ahead of time and warn them that the students will have questions.**

Prepare the students by asking such questions as these:

- Has anyone noticed the maintenance project that we will visit?
- Did anyone notice what the workers are doing? Can you tell us what it is?

- What questions would you like to ask about what they are doing?
✓ List these questions and get volunteers to ask them of the maintenance staff.
- 3. Have the students watch the work and ask their questions.**
- 4. Arrange to have small groups of students observe repair and other maintenance jobs and then report to the class what they saw. Have them use Student Page K.8.6 REPAIRING THINGS for recording what they observe.**
- 5. Develop a class chart about things the class has seen repaired or otherwise maintained. Be sure to include the tools used.**

Ask questions such as these:

- What was worked on?
- Why was it being worked on?
✓ Something is broken, doesn't work well, needs to be made to look better, needs to be protected, and so forth.
- What must be done to maintain or repair it?
✓ Replace a part, adjust a part, cut back growth, paint or wax it, and so forth.
- What tools were used?

EXTENSION

- Have the students report on repairs and other maintenance done at home and in the community.



**GO, GROW, AND
GLOW
SP K.8.1**

Name _____

Date _____

Draw or paste in pictures of things that GO, GROW, and GLOW. Glue them in the right category.

GO

GROW

GLOW



**MAKING
THINGS MOVE
SP K.8.2**

Name _____

Date _____

Draw pictures showing how to move

A CAR

A HOUSE

A COW

A HILL



RAMMERS
SP K.8.3

Name _____

Date _____

CONTEST NUMBER	Draw a star by the winner's name	
	Name	Name



**TURNING
THINGS OFF
SP K.8.4**

Name _____

Date _____

Draw or paste in pictures of things you know how to turn
OFF safely.



ON AND OFF
SP K.8.5

Name _____

Date _____

Draw or paste in pictures of things that you can safely turn
ON and **OFF**.

**REPAIRING
THINGS
SP K.8.6**

Name _____

Date _____

THINGS REPAIRED	HOW THEY WERE REPAIRED



**KINDERGARTEN
CLUSTER 9**

Conservation, Recycling, and Decomposition

- | | |
|-------|-------------------|
| K.9.1 | Decomposition |
| K.9.2 | Waste Disposal |
| K.9.3 | Recycling Project |
| K.9.4 | Making Paper |



K.9.1 DECOMPOSITION

OBJECTIVES

The students

- identify things that decompose rapidly
- identify things that do not decompose rapidly
- make and test predictions
- create a working definition of decomposition

BACKGROUND

DECOMPOSITION is part of a series of activities dealing with waste, decomposition, and conservation. It is usually followed by K.9.2 WASTE DISPOSAL, K.9.3 RECYCLING PROJECT, and K.9.4 MAKING PAPER. Waste is also studied in K.3.15 ANIMAL WASTE. The importance of conservation is also discussed in K.8.4 TURNING THINGS OFF, K.8.5 TURNING THINGS ON, and K.8.6 REPAIRING THINGS.

Long-term study

In DECOMPOSITION the students begin a seven-year study of decomposition. They collect various things from their lunch that they think might or might not decompose. They then put the material into clear plastic bags so that any rotting process can be observed. When the bags are pinned to the bulletin board, the students have a constant view of the decomposition.

Caution

There may be students in the class who are allergic to mold or other substances. If so, this should be taken into consideration before the bags are punctured to note their odor.

STUDENT ROLES

Sanitary engineer
Biologist

MATERIALS

chart paper
lunch garbage
resealable plastic bags, heavy-weight, freezer-type
masking tape for labels
thumbtacks
garbage can
pointed stick, tongs, or rubber gloves
Working Dictionary
Student Page K.9.1 LUNCH WASTE

PRODUCTS

Class chart about lunch waste
Working definition of decomposition
Completed Student Pages

PROCEDURES**1. Discuss plans to observe the decomposition of waste materials.**

Ask such questions as these:

- Did anyone bring lunch or a snack today?
- How was your lunch or snack wrapped?
- What do you think would happen to food left in a plastic bag for several weeks?
- What do you think would happen to a paper napkin if you left it in a plastic bag for several weeks?
- How could you find out whether your ideas are right?
- What part of your lunch or snack do you want to put into plastic bags to see what happens?

2. Have the students save different kinds of garbage in plastic bags to observe for several weeks. Include both once-living materials such as food and paper and not-living materials such as plastics, metals, and foils.

- Have the students put the waste in heavy-duty, resealable, freezer bags.
- Label the bags and tack them to the bulletin board.
 - ✓ Be sure the tacks go through the plastic above the seal.
 - ✓ If a bag begins to smell, seal it in a second bag.
- Have the students wash their hands after putting garbage in plastic bags.
- Ask the students to predict what will happen in each bag. Record their predictions on a class chart about lunch waste.
- Have the students report on changes that they see in the bags and record them on the class chart about lunch waste and on Student Page K.9.1 LUNCH WASTE.
- Have the students predict which bags will smell when opened.
- After several weeks put the bags one at a time in a garbage can lined with a large plastic bag and puncture them testing for odor.

3. Help the students classify the contents of the bags into those things that rotted or decomposed and those that did not.

Ask such questions as these:

- What kinds of garbage decomposed?
 - ✓ Initially use the students' classification.
- What happens when things decompose?
 - ✓ Get at the idea that things change in color, texture, smell, and so forth.
- Did any of the food you put in the bags decompose?
 - ✓ Work to the consensus that it is mostly the foodstuff that decomposed.
- Is food living, once-living, or never-living?
 - ✓ Work to the consensus that the food was once living.
- What might happen to food if it were buried in the ground?
 - ✓ Record predictions.
- Did anything else decompose?

- Did any of the plastic decompose?
- Is plastic living, once-living, or never-living?
 - ✓ Work to the consensus that it is not-living and never-living. Plastic is usually made from oil that came originally from once-living matter. However, thinking of oil as once-living is a real stretch for kindergartners' imagination.
- What might happen to paper, plastic, and metal if they were buried in the ground?
 - ✓ Record predictions.

4. Have the students create a working definition of decomposition and record it in the Working Dictionary.

EXTENSIONS

- Have the students observe and record the decomposition of the class Halloween jack-o-lantern.
 - ✓ Put the jack-o-lantern into an aquarium or a transparent plastic bag with holes and let it stand.
 - ✓ Be conscious of the child who may be sensitive to molds. If such a child is in your room, seal the container, letting no air in or out.
 - ✓ It is interesting to compare the decomposition of a jack-o-lantern and an uncut pumpkin.
- Help the students write a Something Is Growing in the Back of the Refrigerator rhyme.



K.9.2 WASTE DISPOSAL

OBJECTIVES

The students

- make predictions about decomposition based on previous experiments, experience, and observations
- design an experiment

BACKGROUND

WASTE DISPOSAL is part of a series of activities dealing with waste, decomposition, and conservation and is designed to follow K.9.1 DECOMPOSITION. Other activities in the series are K.9.3 RECYCLING PROJECT and K.9.4 MAKING PAPER.

The setting

More and more communities are facing problems of waste disposal. The question of what decomposes and what doesn't has numerous social and ecological implications. WASTE DISPOSAL addresses the problem of long-term decomposition and leads into studies of how waste can be recycled and how it can be composted.

DASH decomposition studies

Materials first buried in kindergarten that do not completely decompose are inspected and reburied every year through DASH 6. This gives the students a truly long-term view of the nature of decomposition. A school may keep certain items in the burial-inspection-reburial cycle after the seven-year period to see what happens over an even longer time span. WASTE DISPOSAL should be done in April or May of the year.

STUDENT ROLES

Scientist
Ecologist

MATERIALS

plastic-net bags or old nylon stockings

resealable plastic bags (small)

index cards

pencils

shovel

pick

burial materials:

meat, fruit, vegetables, prepared foods (bread, pudding, pizza, and so forth), paper, aluminum, tin cans, glass, wood, bone, hard plastic, Styrofoam, and other things students suggest

Student Page K.9.2 WASTE DISPOSAL

PRODUCTS

Class chart about decomposition

Completed Student Pages

PROCEDURES**1. Set the stage by reviewing Activity K.9.1 DECOMPOSITION.**

Ask such questions as these:

- What happened to the food you left in the plastic bags?
- What did you predict might happen to food and other waste that is buried in the ground?
- What do you think cities do with their garbage?
✓ Burn it, bury it, and so forth.
- Does anyone know someone who buries grass or leaves from the lawn? Anyone who buries garbage?
- What do you think would happen if you buried garbage in the ground?
- What might happen to dead or once-living things?
- What might happen to never-living things?
- How could you find out what happens to these things?

2. Help the students design an investigation to bury the different kinds of garbage in plastic-net bags or old nylon stockings.

Help the students do the following:

- Invent a way of marking the burial spot so they can find the bags again next fall.
- Select items to bury.
- Make predictions about what each thing will look like when they dig it up in the fall.
- Make a class chart about waste disposal to record information about the items buried and predictions about what things will look like when they are dug up.
- Invent ways of tagging each bag of material so that it can be identified.
 - ✓ Review things that did not decompose such as resealable plastic bags with paper in them.

3. Bury the materials.

4. Prepare for the long-term investigation of the buried materials.

Have the students do the following:

- Use Student Page K.9.2. to make drawings of what they bury.
 - ✓ Have them save this information in their Science Record Books.
 - ✓ Have them include the date of original burial and the teacher's name.
- Make a map of the burial site.
 - ✓ The burial information should be passed on to *DASH 1* teachers.

EXTENSION

- Help the students make a bulletin board display of what they have buried and their predictions.



K.9.3 RECYCLING PROJECT

OBJECTIVES

The students

- practice conservation
- collect wastepaper
- recycle paper
- experience working with older students

BACKGROUND

RECYCLING PROJECT is part of a series of activities dealing with waste, decomposition, and conservation. It usually precedes Activity K.9.4 MAKING PAPER. Other activities in the series are K.9.1 DECOMPOSITION and K.9.2 WASTE DISPOSAL.

DASH recycling projects

At each grade level it is suggested that DASH students have an intergrade collection of some kind of material for recycling. Paper is suggested for kindergartners working with sixth graders.

Getting help

Paper is a reasonably safe but bulky material to collect and store, needing older, stronger backs and arms. It is suggested that kindergartners initiate the project by sending a letter to a sixth-grade or other older class inviting them to help in a paper recycling project.

The two groups will need to jointly contact a commercial recycler requesting a representative to come to the school and show them what kinds of paper to collect and how to keep and store it. They will also need to enlist the help of parents and the janitorial staff of the school.

Administration and staff

Contact the administration before starting the project. The project will take considerable coordination of classes, parents, and janitorial staff. There is excellent publicity potential in the project.

It will be important that an upper-grade cooperating teacher be contacted ahead of time as well as janitorial personnel who will have to cope with piles of paper.

STUDENT ROLES

Recycler
Conservationist

MATERIALS

paper
boxes
string
Student Page K.9.3 RECYCLING PAPER

PRODUCTS

Proceeds from sale of paper
Completed Student Pages

PROCEDURES

1. **Early in the year encourage the students to save large scraps of paper in a class scrap box. These scraps should be used whenever possible to establish a conservation mind set.**
2. **Introduce the idea of recycling paper on a day when there is a large amount of paper waste. Have on hand some item that is made from recycled paper and has a logo showing it to be made from recycled paper.**

Ask such questions as these:

- Does anyone know what the logo or symbol on this carton (bag, card, and so forth) means?
✓ Get at the idea that it means that the paper has been recycled.
- Does anyone know what *recycling* means?
✓ Get at the idea that it means being used again.
- Have you recycled paper?
✓ Discuss the use of paper in the class scrap box.

- How might you recycle paper when there is more than you can use?
 - ✓ Get at such ideas as saving paper and turning it over to a recycler who helps make new paper from old paper.
 - ✓ Someone might suggest that the class make new paper out of old paper themselves. Put this idea on hold until Activity K.9.4 MAKING PAPER.
 - Since paper is really heavy when you have a lot, what other class might be willing to help you with collecting and storing the paper?
3. **Help the students write a letter to a sixth-grade or other class asking for help with their recycling project.**
 4. **Have the kindergarten and sixth-grade or other students plan the activity and carry out the recycling project together.**

Help the students include the following:

- What kinds of paper to collect.
 - How the paper is to be collected.
 - How the paper is to be bundled.
 - Where the paper is to be stored.
 - How to secure a recycler.
 - ✓ Each step will require considerable coordination with the school staff.
 - How any proceeds are to be distributed between classes.
 - ✓ This will give each group a chance to think about supporting some needy group or worthwhile project as well as celebrating their work together.
5. **Help the students carry out the project.**
 6. **Have the kindergartners debrief the project with the sixth graders or others.**

Help the students do the following:

- Give team reports on what each group did.
- Assess how things could be done better next time.
- Tell how the proceeds of the recycling have been used.

EXTENSIONS

- Post a graph each day of the paper collection to show the amount gathered.
- Set a goal and graph how close the project came to reaching its goal.
- Hold a recycling party. Invite all the people who helped with the project. This can be a time for rolling out Learning Calendars to show parents what has been done during the year.



K.9.4 MAKING PAPER

OBJECTIVES

The students

- recycle used paper
- make *new* paper from *used* paper

BACKGROUND

MAKING PAPER is the last of four activities dealing with waste, decomposition, and conservation. It is designed to follow Activity K.9.3 RECYCLING PROJECT. Other activities in the series are K.9.1 DECOMPOSITION and K.9.2 WASTE DISPOSAL.

Paper making as recycling

Paper can be recycled in many ways. One way is to sell it to recycling companies as in Activity K.9.3 RECYCLING PAPER. However, many companies do not want small quantities. In this activity students recycle small quantities of used paper themselves to make *new* paper.

Paper recipe

One recipe for paper making is described below:

- Tear used paper into small pieces.
- Place the pieces in a plastic container. Fine sawdust, dryer lint, dried leaves, flower petals or spices, can be added.
- Cover the mixture with water and soak it for 5-10 minutes.
- Put small amounts in a blender at low speed until it has the consistency of thin oatmeal.
- Pour the mixture into a tub and add water to make it a slushy
- Dip a piece of fine screening into the slushy mixture.
- Slowly pull the screen straight up out of the slush.
- Be sure the slush is distributed evenly over the screen.
- Place the screen with the slush on newspaper to dry.
- Peel the "new" paper off the screen carefully when it is dry. (It may be ironed between sheets of newspaper if desired.)

Caution: Be careful not to blend too many colors together or the resulting color will be a gray brown.

STUDENT ROLES

Recycler
Paper maker
Artist

MATERIALS

used paper
water
blender
fine window screening cut into small pieces (6 in. x 6 in. works well)
plastic containers such as large pails
newspaper
optional:
 dryer lint
 very fine sawdust
 dried leaves
 flower petals
 thread
 spices (oregano, nutmeg, etc.)

Student Page K.9.4 MAKING PAPER

PRODUCTS

Class recipe for making paper
New paper out of old
Completed Student Pages

PROCEDURES

1. **Discuss ways to recycle paper.**
2. **Introduce the idea of making new paper from used paper. Provide the students with the basic recipe. They may choose to add such things as sawdust, threads, bits of leaf, spices.**
 - Begin by discussing how paper can be made. Develop a recipe.
 - Have the students select their ingredients.
 - Record the class recipe on chart paper.
 ✓ Make it as pictorial as possible.

- Have the students copy the recipe on the Student Page K.9.4 MAKING PAPER.
3. **Discuss safety rules for using the blender and help the students make paper. This may be a time to ask for parental help.**
 4. **Have the students use their new paper for some special project. Some possible ideas include thank-you letters for help in their paper recycling project, greeting cards, recycling posters, etc.**
-

EXTENSION

Keep a class list of ways paper can be recycled.



LUNCH WASTE
SP K.9.1

Name _____

Date _____

What I put in the bag	What I think will happen to it
Date	Observations

Name _____

Date _____

Date of burial	
Place of burial	
What was buried	Predictions



**RECYCLING
PAPER
SP K.9.3**

Name _____

Date _____

Work with your partner to answer the following questions:

What did we have to do to recycle paper?

How much money did we collect?

How did we spend the money?



MAKING PAPER
SP K.9.4

Name _____

Date _____

HOW TO MAKE PAPER



**KINDERGARTEN
CLUSTER 10**

Matter, Space, and Construction

- K.10.1 Cubby Organization
- K.10.2 Patterns in Puzzles
- K.10.3 Making Envelopes
- K.10.4 Making Puzzles
- K.10.5 Making Boxes and Bags
- K.10.6 Volume of Boxes and Bags
- K.10.7 Packing and Storing
- K.10.8 Linear Measurement



K.10.1 CUBBY ORGANIZATION

OBJECTIVES

The students

- put things away in their assigned places
- store things in their personal storage space
- discuss the need for respect for their own and other's personal property

BACKGROUND

CUBBY ORGANIZATION is part of a series of activities dealing with space and organization. Others in the series are Activities K.10.2 PATTERNS IN PUZZLES, K.10.3 MAKING ENVELOPES, K.10.4 MAKING PUZZLES, K.10.5 MAKING BOXES AND BAGS, K.10.6 VOLUME OF BOXES AND BAGS, K.10.7 PACKING AND STORING, and K.10.8 LINEAR MEASUREMENT.

Logic for the series

The concept of volume is so crucial to later understanding of the material world that it pays to spend some time to ensure that students leave kindergarten with a strong beginning understanding. The approach used here is to engage students in very practical problems and develop meaning through dialog and practical investigations. The beginning point is to look at a common problem in a classroom—the organization and storage of personal school things.

Logic for the activity

CUBBY ORGANIZATION introduces the idea that there is a need for a storage place for personal things as well as for community equipment and materials. Stress the importance of cooperation in caring for and storing things. Organization is a skill initially requiring direct teaching. Some students will seem to come by organization naturally, but even these students need good models of well-organized environments, labeled boxes, and storage space. They need to see things stored efficiently and compactly.

When to start

This activity should come early in the year. It is appropriate anytime supplies, equipment, and materials need to be organized, put away, and stored.

STUDENT ROLES

Inventor
Storage engineer

MATERIALS

cubbies or other personal storage spaces
storage containers, boxes, plastic bags, and so forth
labels
marking pens
Student Page K.10.1 THINGS IN MY CUBBY

PRODUCTS

Orderly individual storage spaces
Orderly classroom storage areas
Completed Student Pages

PROCEDURES

1. **To model organization, label items and storage areas.**
 - Send a note home to remind the parents to label students' personal items with their names.
 - Keep labels on hand for students to label things. Their initials will usually be sufficient. See Activity K.1.15 MAKING FRIENDS.
2. **Show the students personal and community equipment and materials. As part of ongoing class organization discuss storage and use of materials.**

Include such things as these:

 - Where things belong and how they are to be stored.
 - Which things are to be shared and used by the whole class.

- Which items are for personal use.
- What things need to be protected from dust, moisture, and heat and how this might be done.

3. Have the students survey the classroom storage areas and containers.

Ask such questions as these:

- Where are the cupboards in the classroom?
- Where are personal cubbies or other storage areas in the classroom?
- How are personal storage areas and cupboards alike? How are they different?
- How are school bags and personal storage areas alike? How are they different?

4. Discuss concerns about materials in personal storage areas with the class.

Ask such questions as these:

- What things belong in a cubby or other personal storage area?
- What other things could go in a cubby or other personal storage area?
- What things don't belong in a cubby or other personal storage area?
- Where do those things that don't belong in a cubby or other personal storage area go?
- Where would you put something that is wet? Or dirty? Muddy? Large? Tall or long? Very small?
- Where would you put something that needs to be kept cold? Warm?

5. Putting things away and getting out equipment and materials should progressively become the students responsibility.

- Particular responsibilities can be posted on the Responsibility Chart.
 - Reinforce order and neatness by having students report on new-found ways to more effectively and aesthetically store materials.
- 6. Help the students organize their cubbies or other personal space for convenience and quick storage and retrieval of items. Periodically check on improvements in their use of personal space.**
-

EXTENSIONS

- When something new needs to be stored, have the students help decide where to put it and how to store it.
- Have the students invent personal storage containers for small items.



K.10.2 PATTERNS IN PUZZLES

OBJECTIVE

The students

- put together picture puzzles
- find that assembled puzzles occupy less surface than unassembled puzzles
- practice recognizing interlocking shapes

BACKGROUND

PATTERNS IN PUZZLES is part of a series of activities dealing with space and organization. It is usually followed by Activities K.10.3 MAKING ENVELOPES, K.10.4 MAKING PUZZLES, K.10.5 MAKING BOXES AND BAGS, K.10.6 VOLUME OF BOXES AND BAGS, K.10.7 PACKING AND STORING. Others in the series are K.10.1 CUBBY ORGANIZATION and K.10.8 LINEAR MEASUREMENT.

Logic of the activity

PATTERNS IN PUZZLES deals with the organization of a two-dimensional surface area, in particular, how to pack a surface efficiently when there are many items.

Here the students assemble picture puzzles. It is important for students to practice identification of visual and kinesthetic patterns so that they can begin to manipulate patterns in their minds.

To encourage the students to work further at the puzzles in an activity center, a game format is suggested involving 2-3 players.

Puzzle Game 1 for frame-type puzzles

Player 1 draws a puzzle piece from a box or bag and makes a play if the piece fits against the frame. Otherwise, the piece goes into a common builder's collection outside the box or bag.

Each successive player draws a piece from the box or bag and plays it if a) it fits against the frame or b) it fits against a piece already in the puzzle. Otherwise the piece goes into the builder's collection.

If a player successfully places a piece in the puzzle, that player can then try to fit any of the pieces that are in the builder's collection. With each piece placed, the player can try another piece until no more pieces that fit can be found. The game ends when the puzzle is completed.

Puzzle Game 2 for non-frame-type puzzles

This game is played the same way as the frame-type puzzle game. Assembling starts when the first edge piece is drawn. Any edge piece can be played when it is drawn.

Use of a tally system

Use of a 5-line tally system is introduced to keep track of the numbered pieces during the game. One vertical line is used for each piece up to four lines. The fifth line representing the fifth piece crosses through the other four to register a grouping of 5. This system is a common recording system in science.

STUDENT ROLES

Puzzle solver
Packing engineer

MATERIALS

commercial puzzles with and without frames
Student Page K.10.2 TALLY SHEET

PRODUCTS

Completed puzzles
Completed Student Pages

PROCEDURES

1. **Demonstrate the Puzzle Game 1 for frame-type puzzles to the class. Introduce a tally system with four vertical lines and a strike through to represent five (III) pieces. Have the students use Student Page K.10.2 TALLY SHEET.**
2. **Have the students play several games with different puzzles. When they become proficient with frame puzzles, introduce non-frame puzzles and Puzzle Game 2.**

Ask such questions as these:

- How do you know when a puzzle piece fits?
✓ Work for agreement that the picture makes sense and that where the pieces fit together there is no space left between them.
- What do you look for to find a puzzle piece that fits another?
✓ Work for agreement that they look for a pattern of pictures and shapes.
- Which takes up more space, the pieces when they have been put together or when they are separated?
✓ Work for agreement that the finished puzzles take up less space. This can be verified by trying to fit the unassembled pieces in a frame.
- Why do the unassembled pieces take up more surface than assembled pieces?
✓ Work for agreement that the unassembled pieces have spaces between them and that the assembled pieces have no spaces.
- Which would take up less space in our storage cupboards, assembled or unassembled puzzles? Why?
- When storing items in a box how could you make the best possible use of the space in the box?
✓ Work for the idea that the items would have the least possible or no space between them.

EXTENSIONS

- Turn the pieces of picture puzzles over or upside down so that the students work only from shape clues.
- Put puzzles in a learning center.



K.10.3 MAKING ENVELOPES

OBJECTIVES

The students

- construct paper envelopes
- discover uses for envelopes

BACKGROUND

MAKING ENVELOPES is part of the series dealing with space, surface and organization. It usually follows K.10.1 CUBBY ORGANIZATION and K.10.2 PATTERNS IN PUZZLES and precedes K.10.4 MAKING PUZZLES, K.10.5 MAKING BOXES AND BAGS, K.10.6 VOLUME OF BOXES AND BAGS, and K.10.7 PACKING AND STORING.

Logic for the activity

This activity begins the transformation of two-dimensional paper into three-dimensional containers. Here the students construct an envelope that will be needed in Activity K.10.4 MAKING PUZZLES, which usually follows closely.

Envelope Patterns

Envelopes can be made from several designs. Take apart commercial envelopes and refold them so that the students can see how they are made. With this knowledge, have them invent their own envelopes. Making envelopes should be an ongoing invention project in which the students are constantly encouraged to improve on previous designs whenever the need for envelopes arises.

Criteria for evaluating envelopes

Have the students show their envelopes. When closed they should hold contents without spilling them. They should lay flat, and ideally should be pleasing to the eye.

STUDENT ROLES

Inventor
Paper crafter

MATERIALS

paper

glue

tape

scissors

Student Page K.10.3 USING ENVELOPES

PRODUCTS

Envelopes

Completed Student Pages

PROCEDURES**1. Introduce the need to make something to hold a greeting card.**

Ask such questions as these:

- What would such a container look like?
 - ✓ Get at such things as a pouch, an envelope, a box, and so forth.
- What would be the purpose of such a container?
 - ✓ Get at such things as to protect the card, hide the contents of the card, allow one to write an address for mailing, or to keep and store the card.
- What else could such a container be used for?
 - ✓ Get at such things as to hold letters and other things you mail, or to store things.
- If you wanted to make an envelope how could you find how envelopes are made?
 - ✓ Get at such things as looking at one or taking one apart.
 - ✓ Show the student a couple that you have take apart.
 - ✓ Have students fold them back into envelopes.

2. Have the students invent and make envelopes. Put paper and other necessary items in an Inventors Box.

Help them do the following:

- Make folds.
- Glue or tape edges.

- Leave a flap open so that they can put things inside and then seal the envelope.

3. Have the students compare envelope designs.

Ask such questions as these:

- Which envelopes can hold the most? Why?
- Which of the envelopes can lie flat?
- What are the advantages of having envelopes that lay flat?
 - ✓ Get at ease of storing, mailing, and so forth.
- Which envelopes look the nicest? Why do you think so?
 - ✓ Get at neatness of folds, cutting, gluing.
- Why is the way something looks important?
 - ✓ Get at the fact that people usually prefer to have things that look *nice* around them.
- Can you think of other envelope designs?
 - ✓ Use these designs whenever envelopes are needed.
 - ✓ Have the students make and keep an envelope for Activity K.10.4 MAKING PUZZLES.

4. Have the students use Student Page K.10.3 USING ENVELOPES to make a list of different things that they store in envelopes. This list can be added to over time. Use drawings and copied words.

EXTENSION

- Have the students make envelopes to use for holiday greeting cards, notes home, or to store other supplies.



K.10.4 MAKING PUZZLES

OBJECTIVES

The students

- make and work puzzles of geometric shapes
- assemble puzzles others have made
- practice recognizing interconnecting shapes

BACKGROUND

MAKING PUZZLES is part of a series of activities dealing with space and organization. It usually follows K.10.2 PATTERNS IN PUZZLES and K.10.3 MAKING ENVELOPES, and precedes K.10.5 MAKING BOXES AND BAGS, K.10.6 VOLUME OF BOXES AND BAGS, and K.10.7 PACKING AND STORING. Others in the series are K.10.1 CUBBY ORGANIZATION and K.10.8 LINEAR MEASUREMENT.

Logic of the activity

In MAKING PUZZLES, the students design their own puzzles. First they make a puzzle by cutting up a postcard or other picture into pieces. Then they make geometric puzzles that are assembled into patterns and figures. Envelopes made in Activity K.10.3 MAKING ENVELOPES are used to hold puzzle pieces.

Suggestions for making picture puzzles

Have the students cut up old postcards, photos, or their own drawings into eight to ten pieces using scissors. Have them put the pieces in an envelope and mark it with their name or initial.

Suggestions for making geometric puzzles

Pieces for geometric puzzles can be cut out of Student Page K.10.4 PUZZLE PIECES. Alternatively, cut pieces of lightweight cardboard into straight sided shapes—triangles, rectangles, trapezoids or whatever. This can be done with a paper cutter.

STUDENT ROLES

Puzzle maker
Puzzle solver

MATERIALS

precut pieces of cardboard
Post-it glue
5 x 8-in. index cards
uncut postcards or photos
scissors
Student Page K.10.4 PUZZLE PIECES

PRODUCT

Completed Student Pages

PROCEDURES**1. Have the students make postcard puzzles.**

Help them do the following:

- Cut up a postcard or picture into 8–10 pieces.
 - ✓ Alternatively, have them draw a picture on a 5 x 8-in. index card and cut this into puzzle pieces.
- Put the pieces in an envelope.

2. Have the students exchange puzzles and put them together.**3. Show the students how to make figures out of geometric puzzle pieces. Cut the pieces out of Student Page K.10.4 PUZZLE PIECES to make a pattern or use 4 or 5 precut pieces.**

Help them do the following:

- Make a pattern or figure using the pieces.
- Secure the pieces to a sheet of paper with Post-it glue.
- Outline the pattern or figure on the paper.
 - ✓ This becomes the frame of the puzzle.

- Check to see that the outline closely follows the shapes of the pieces and remove the pieces.
- Put the pieces in an envelope and staple or tape the envelope containing the pieces to the frame with the pattern outline.

4. Have the students exchange and work puzzles.

Help them do the following:

- Remove the puzzle pieces from the envelope.
- Place the puzzle pieces in the frame so that they rebuild the figure as outlined.
- Use Post-it glue to hold puzzle pieces to the frame.
- Verify the solution with the designer.
- Remove the pieces from the frame and return them to the envelope.

5. Summarize the activity.

Ask such questions as these:

- Which is easier to work, a puzzle with pieces that have pictures and shapes or a puzzle with pieces that have shape only? Why?
✓ Most students will indicate a puzzle with a picture and shape because they get more clues.
- What kinds of things that you do are like working these puzzles?
✓ Work toward trying to find pieces of a broken cup to glue them back together; trying to find how a collection of parts can be put together to make something you know about, as with the Inventor's Box; what you do when you have lost the instructions to put together a toy.
✓ It's also like packing things in boxes, drawers, or suitcases, and storing things to get things as compact as possible.
✓ Someone may suggest that it is like finding how things you know about fit together.

EXTENSION

- Put the puzzles in the activity center so that others can work them.



K.10.5 MAKING BOXES AND BAGS

OBJECTIVES

The students

- invent and make paper bags
- invent and make boxes
- make a three-dimensional bag or box from two-dimensional paper
- identify uses for bags and boxes

BACKGROUND

MAKING BOXES AND BAGS is part of the series dealing with space and organization. It usually follows Activities K.10.1 CUBBY ORGANIZATION, K.10.2 PATTERNS IN PUZZLES, K.10.3 MAKING ENVELOPES, and K.10.4 MAKING PUZZLES and precedes K.10.6 VOLUME OF BOXES AND BAGS and K.10.7 PACKING AND STORING. In MAKING BOXES AND BAGS the students create three-dimensional bags or boxes from two-dimensional paper.

Source of bag and box patterns or templates

Templates for the bags and boxes can be made by disassembling commercial products. It is important that the students see how paper and cardboard can be folded and taped to make three-dimensional objects. Disassembled boxes and bags give the students an opportunity to put them together and discover their structure. Seams can be unglued by moistening them and tape can be slit.

Of the many ways of creating bags, one of the quickest and easiest to understand is to fold plain paper around the four sides and the bottom of a box, tape it, and then slip out the box, leaving the covering bag behind.

Inquiry through disassembling and reassembling

Disassembling and reassembling bags and boxes is most informative. Disassembling and reassembling devices is a primary way of finding out how technological things work. The same processes are used in the sciences, particularly in physics and chemistry.

MAKING BOXES AND BAGS introduces students to manipulating two-dimensional surfaces to form objects that occupy three-dimensional space. This involves mental operations that are basic to thinking about the structure of objects. The skills of making boxes and other containers can be called upon anytime containers are needed.

Timing

The inventing and making of bags can be done as a separate activity from the box making. Both make ideal companions for holiday art lessons.

STUDENT ROLES

Inventor
Paper product engineer
Product evaluator

MATERIALS

bag and box templates
recycled holiday wrapping paper
paper
glue
scissors
tape
oaktag
Student Pages K.10.5 BOX PATTERN

PRODUCTS

Boxes
Bags
Box and bag templates
Completed Student Pages

PROCEDURES

1. **Introduce the activity by stating that we need to make some bags for some project.**

Ask such questions as these:

- How is a bag similar to an envelope?
✓ Get at such things as they both are containers, they both can be folded flat, they both can be made of paper, and so forth.

- How is a bag different from an envelope?
 - ✓ Get at such things as a bag unfolds to give a large pouch and you can carry things that are not flat in a bag while they have to be quite flat in an envelope.
 - What kinds of things are bags made of?
 - ✓ Get at such things as plastic, cloth, and leather.
- 2. Show the students the patterns from different commercial bags.**
- Have the students do the following:
- Explore the patterns.
 - Disassemble and reassemble the patterns.
- 3. Have the students invent their own bags and decide what they want to put in them.**
- Help the students do the following:
- Fold and assemble their invented bag.
 - Disassemble their bag and then reassemble it.
 - Glue where needed.
- 4. Introduce the activity when there is a need for box-like containers.**
- Ask such questions as these:
- How is a box similar to a bag?
 - ✓ Get at such things as they both are containers and they both can carry things that are not flat.
 - How is a box different from a bag?
 - ✓ Get at such things as a box is rigid a while a bag is flexible and a box has a lid but a bag doesn't.
 - What else can boxes be made of?

5. Show the students patterns from different commercial boxes.

Have the students do the following:

- Explore the patterns.
- Disassemble and reassemble boxes and the patterns.

6. Show the students the pattern for a box on Student Page K.10.5 and have them make a box using the pattern.

Help the students do the following:

- Cut out the template or pattern.
- Fold the template into a box.
- Disassemble the template.
- Trace the template on oaktag or lightweight cardboard and assemble the box.
 - ✓ To fold cardboard evenly along the fold line, make an indentation along the line. Use a blunt pencil point or ball point pen and a ruler to make the indentation straight.
 - ✓ Use glue or tape as needed.
- Invent another box folded using paper or oaktag.

7. Summarize the activity.

Ask such questions as these:

- What advantages do envelopes have over boxes and bags?
 - ✓ Get at such things as envelopes lay flat and take up less space.
- What advantages do boxes and bags have over envelopes?
 - ✓ Get at such things as one can store large thick things in boxes and bags.
- How could you find out how a toy is constructed?
 - ✓ Get at the idea of taking it apart and putting it back together.

EXTENSIONS

Have the students do the following:

- Take apart other bags and boxes and reassemble them.
- Use commercial bags as templates or patterns to make their own bags.
- Make bags from holiday gift wrap paper.



K.10.6 VOLUME OF BOXES AND BAGS

OBJECTIVES

The students

- explore the concept of volume
- explore volume measurement
- practice using the terms *more than*, *less than*, and *the same as* with volume estimation
- are introduced to standard units of volumetric measurement

BACKGROUND

VOLUME OF BOXES AND BAGS is one of a series of activities dealing with space and organization. Other activities in the series are Activities K.10.1 CUBBY ORGANIZATION, K.10.2 PATTERNS IN PUZZLES, K.10.3 MAKING ENVELOPES, K.10.4 MAKING PUZZLES, K.10.5 MAKING BOXES AND BAGS, and K.10.7 PACKING AND STORING.

Logic for the activity

VOLUME OF BOXES AND BAGS is the first activity to deal directly with volume. Here the students fill boxes and bags with granular Styrofoam to measure their relative volume. Rice and dry sand work well with small boxes but may split bags.

The activity is designed to be carried out as a series of teacher-directed games. Volume estimation is a skill that needs much practice.

Box and bag collection

Collect milk cartons and boxes and bags of various shapes and sizes. These will be used to compare volumetric capacities. Student Page K.10.6 VOLUME OF BOXES AND BAGS can be used to record the students' estimates and actual measurements during the games. Mark the boxes and bags with letters for easy identification.

U.S. standard and metric systems

It is the intent of DASH to enable students to use both the U.S. standard system and the metric system of measurement. Both can be used here. However, to reduce confusion it is suggested that metric measurements be used in this activity.

Units of measure

Use milk cartons with their tent tops removed as standard measuring containers.

**U.S. Standard
and
Metric Equivalents**

half-pint	= approximately 1/4 liter or 250 milliliters
pint	= approximately 1/2 liter or 500 milliliters
quart	= approximately 1 liter or 1,000 milliliters
half-gallon	= approximately 2 liters or 2,000 milliliters

Mathematical language

In addition to the concept of volume, VOLUME OF BOXES AND BAGS provides an opportunity to show examples of mathematical concepts of *more than*, *less than*, and *equal to* as well as *half as much*, *twice as much*, *four times as much*, and so forth. The associated language should be used whenever possible.

STUDENT ROLE

Researcher

MATERIALS

boxes of varying sizes, small to medium size
bags of varying sizes, small to medium size
volumetric measuring tools, milk cartons with their tent-tops cutoff:
 1/4 liter (1/2 pint), 1/2 liter (pint),
 1 liter (quart), 2 ONE-liter (1/2 gallon)
Styrofoam or other granular material
brooms
dustpans
Student Page K.10.6 VOLUME OF BOXES AND BAGS

PRODUCTS

Labeled set of standardized containers.
Completed Student Pages

PROCEDURES

- 1. Introduce the games by giving groups of students two standard cartons—a $\frac{1}{4}$ liter (half-pint) carton and a liter (quart) carton. Tent tops of the cartons should be cut off.**

Ask questions such as these:

- Do these cartons (the $\frac{1}{4}$ liter and liter cartons) hold the same amount of stuff?
- How could we find out whether they both can hold the same amount of stuff?
 - ✓ Work toward the procedure of filling one carton full of something and then pouring the contents into the other carton for comparison.
 - ✓ Have the students test their estimates.
- Do they hold the same amount? Which one holds more? How did you find out?
- How much more did one hold than the other? How did you find out?
 - ✓ Work for consensus that the liter carton filled the $\frac{1}{4}$ liter carton about 4 times.
- Does anyone know what we call a container of this size?
 - ✓ Identify the original containers as a $\frac{1}{4}$ liter (half-pint) carton and a liter (quart) carton.
 - ✓ Have the students label the cartons. Mark the liter carton as holding 4 of the $\frac{1}{4}$ liter cartons.

- 2. Guide the investigation in Game A, Comparing Volumes. Have the students keep their standard containers. Give each group a selection of 4–6 test cartons of at least 4 different sizes. Include a $\frac{1}{4}$ liter ($\frac{1}{2}$ pint), $\frac{1}{2}$ liter (pint), liter (quart), and 2-liter ($\frac{1}{2}$ gallon) container.**

Ask questions such as these:

- In this collection can you find a carton that will hold about the same amount as the carton labeled $\frac{1}{4}$ liter?

- ✓ Have the students work in small groups to test their selections by filling the cartons with Styrofoam or other granular material. Other techniques should be encouraged. If the students can read, blank out the label information with tape.
- ✓ Have the groups work until they find a matching carton.
- How do you know that it holds about the same amount?
 - ✓ Have the groups demonstrate their verification techniques.
- Is there a carton that will hold about the same amount as our carton labeled 1 liter? Which one?
 - ✓ Have the students follow the same procedure as for the $\frac{1}{4}$ liter ($\frac{1}{2}$ pint) carton.
- Is there any carton that holds about 2 of the $\frac{1}{4}$ liter cartons of material? Which one?
 - ✓ Have the students test their selections. Label the carton as $\frac{1}{2}$ liter. Also label the carton as two $\frac{1}{4}$ liters.
- Is there any carton that holds about 2 liters of material? Which one?
 - ✓ Have the students test their selections. Label the carton 2 liters.
- How many $\frac{1}{4}$ liters do you think or estimate that a 2-liter container will fill?
 - ✓ Have the students write down the estimates, then test them.
 - ✓ Have them write the number of $\frac{1}{4}$ liters (8) on the 2-liter container.

3. Have the students play Game B, Boxes and Relative Volume.

Help them do the following:

- Put out their labeled cartons in order of sizes from the largest to the smallest volume.
 - ✓ The order will be 2 liter, liter, $\frac{1}{2}$ liter, and $\frac{1}{4}$ liter.
- Test to see whether their order is correct.
- Tell how they know whether their ordering is correct.
- Select two boxes from a collection of irregular-sized boxes and put the labeled cartons and the two boxes in order of size from the largest to the smallest volume.

- Test to see whether their order is correct.
 - ✓ Have the students report on which are the same size, larger, or smaller and how they determined this.
 - ✓ Have them determine how much larger or smaller the container is than a $1/4$ liter carton.

4. Have the students play Game C, Bags and Volume.

- Have the students use the same four labeled containers they used in Game B and a selection of test bags.
- Have the students estimate whether the capacities of the test bags are *more than*, *less than*, or the *same as* each of the test boxes.
- Have the students test their estimates.

EXTENSIONS

- Put tin cans, measuring cups, and other containers in an activity center and have the students estimate their capacities by comparing the volumes with labeled containers. Have the students test their estimates.
- Periodically have the students play an estimation game estimating the volumes of bags and boxes and other containers. This makes an interesting end-of-day or spare-moment activity.



K.10.7 PACKING AND STORING

OBJECTIVES

The students

- observe that crumpled paper takes up more space than uncrumpled paper
- determine that the space in crumpled paper is filled with air

BACKGROUND

PACKING AND STORING is part of a series of activities dealing with space and organization. Others in the series are Activities K.10.1 CUBBY ORGANIZATION, K.10.2 PATTERNS IN PUZZLES, K.10.3 MAKING ENVELOPES, K.10.4 MAKING PUZZLES, K.10.5 MAKING BOXES AND BAGS, and K.10.6 VOLUME OF BOXES AND BAGS.

Logic for the activity

Having worked through the packing of two-dimensional surfaces (puzzles) and the building of three-dimensional containers (boxes and bags), the students should be ready to investigate ways of packing three-dimensional space. Using a game format, they first explore how to use air and wadded paper to fill space. The process is then reversed as they explore efficient packing of space by stacking uncrumpled paper.

Game 1

The players work in groups to crumple newspaper to fill a box. All the boxes have the same dimensions. Full-sized sheets of newspaper are used. Tearing of the paper is not allowed. The winner of the game is the group that uses the least amount of paper to fill the space.

Game 2

The players again work in groups using crumpled newspaper to try to fill the least amount of space possible without tearing the paper. The amount of space will be measured by placing a flat sheet of cardboard over the pile and measuring the thickness of the paper. The winner of the game is the group that fills the least amount of space.

Thickness can be marked with a pencil on the side of the box. Game 2 may be a little more difficult to conceptualize. The first response is usually to compress the crumpled paper. Smoothing and folding may have to be arrived at through discussion or demonstration.

STUDENT ROLES

Packer
Packaging engineer

MATERIALS

corrugated cardboard boxes of the same size and shape (photocopy-paper boxes are excellent)
full-sized newspaper sheets
Student Page K.10.7 PACKING AND STORING

PRODUCT

Completed Student Pages

PROCEDURES

1. Explain the rules and have the students play Game 1.

- Tell the groups that they are to fill the box using as few pieces of paper as possible.
- They may *not* tear the paper.
- The winning group will use the fewest number of sheets of newspaper.

2. Summarize Game 1 with the students.

Ask such questions as these:

- Which group used the smallest number of sheets of newspaper?
- What did you do to the paper to fill the container?
- Which group used the largest number of sheets of newspaper to fill the space?

- How did the way the group using the largest number of sheets of newspaper packed their box differ from the way the group using the least number of sheets packed their box?
- How did this difference in the way the groups packed affect the packing?
✓ Work to the idea that the group that used the least paper used more air to pack the box than the other groups—the air was captured in the crumpled paper.
- When would you want to use the least number of sheets to fill a container?
✓ Work to the idea of using paper to pad out a partly filled box for shipment or trying to make a shock absorber around an object so that it won't break.

3. Explain the rules and have the students play Game 2.

To start the game do the following:

- Give the groups the same boxes used in Game 1.
- Give all groups the same number of crumpled sheets that the group using the most paper in Game 1 used.
✓ Be sure all paper is thoroughly crumpled.
- Tell the players they are to put the paper in the box so that it takes up as little space as possible.
✓ Space will be measured by how thick the pile of paper in the box is.
- Have the students pack their box.
- Measure the stacks. Have the students use Student Page K.10.7 PACKING AND STORING to record measurements.
✓ Place a clipboard on top of the stack and see which stack is the highest.
✓ Height can be marked on the side of the box.

4. Discuss Game 2 with the class.

Ask such questions as these:

- Who had the thickest pile?
- Who had the thinnest pile?

- What is the difference in the way these two piles were made?
 - What effect on thickness do different ways of packing have?
- 5. If no groups smoothed and folded the paper, have the students observe the thickness of smooth newspaper and crumpled newspaper.**

Ask such questions as these:

- Which pile takes up the least space?
 - What could you do to make crumpled newspaper smoother?
 - ✓ Have the students demonstrate their smoothing.
 - ✓ Have them repack their boxes.
 - ✓ Remeasure the height of the piles.
- 6. Summarize the games.**
- Ask such questions as these:
- What does smoothing do to paper?
 - ✓ Get at the observation that it flattens the sheets.
 - How does this seem to reduce the volume?
 - ✓ Get at the observation that when the paper is crumpled there is a lot of air space. When it is flattened, most of the air is removed.
 - What are the advantages of packing things neatly?
 - ✓ Get at the idea that neat packing allows us to pack a space with more stuff as well as making it look nicer.

EXTENSION

- Have the students do a similar activity using cloths or clothing.



K.10.8 LINEAR MEASUREMENT

OBJECTIVES

The students

- invent ways for determining relative length of objects
 - use a string for comparing distances
 - measure distances using non-standard and standard units
 - make paper clip chains to measure length
 - introduce metric units of length
-
- determine whether to use large units or small units based on the distance to be measured

BACKGROUND

LINEAR MEASUREMENT is designed to precede Activities K.6.1. GROWTH CHARTS, K.4.6 GARDENING, and K.7.9 TRAFFIC SIMULATION.

Measurement of length is basic to science and technology. Throughout kindergarten *DASH* there are numerous times when measurement is needed or can be used. In the first part of LINEAR MEASUREMENT, the students are given a length of string and situations to practice making comparisons of length. In the second part, they make their own measuring device out of paper clips, and in the third part they are introduced to the Metric and/or the US Standard system.

Use of the Activity

This activity can be done at one time but is suggest to be done in segments. Parts 1-2 are usually done before or along with the first measurement of height in Activity K.6.1 GROWTH CHARTS, and Parts 3 and 4 before or along with Activities K.4.6 GARDENING and K.7.9 TRAFFIC SIMULATION. Linear measurement is a continuing topic in *DASH* and is again dealt with extensively in Grade 1.

Comparison of length Part 1

Comparison of lengths is introduced in K.4.4 GROWING BEAN SPROUTS and 7.5 HOME LOCATION. Both activities provide a natural

use of ideas in Part 1. First measurement of height is undertaken in Activity K.6.1 GROWTH CHART where a string graph is made to compare student heights. In support of these activities Part 1 of LINEAR MEASUREMENT, involves the students in making and using a string to compare the lengths of various objects. This Comparing String is kept in a box or envelope for use whenever comparisons are called for. the Comparing String is modified in Part 4 to be a meter measuring tool.

Measurement of length Part 2

Part 2 involves measurement of lengths using paper clips and other object. This activity can be introduced along with Activity K.6.1 GROWTH CHART measurement 2. Since counting skills are needed Part 2 is best introduced when most students can count to 25. This may not be until the time of the second measurement of body height in the spring.

Standard measuring units Part 3

In Part 3 the metric units of distance are introduced and students standardize their paper clip chains and Comparing Strings with metric units. Part 3 is best introduced when most students can count to 50 better still 100.

Making extended Comparing Strings Part 4

In part 4 the Comparing Strings are attached to paper clips so they can be linked together to measure longer distances. These longer distance will be needed in Activities K.4.6 GARDENING and K.7.9 TRAFFIC SIMULATION.

Arbitrary nature of units

To make measurements of length a unit of comparison is needed. Examples of standard measuring units are inches, centimeters, yards, and meters. These are arbitrary units in that someone or some group of people selected them to be used as a standard.

In Part 2 the students are introduced to the paper clip as a unit of length. Paper clips are used because they can be linked and are of sufficient size that students can easily handle them. *Jumbo paper clips* have the additional virtue of being about 5 centimeters in length. As long as everyone in the class uses the same kind of paper clips they will get about the same measurements of length. Lines on notebook paper, blocks in the tile floor, new pencils, or others things of constant length could be used in place of paper clips but are much less convenient.

Caution; One must be cautious of paper clips. Check to see that the clips you have are about 5 cm. The 5 cm clip is also 2 inches in length.

Metric and US Standard Systems of measurement

It is the goal in *DASH* that students become proficient in both the US Standard system of measurement and the metric system. At the turn of the millennium there is no movement in the US to fully convert to the metric system as there was in the 1970's. For the sake of simplicity, the units of length used here are metric units. However, the US Standard System can be used equally well. For comparison the 5 centimeter jumbo paper clip is 2 inches long and the meter is about a yard long.

STUDENT ROLE

Engineer

MATERIALS

string cut into approximately 1-meter or 1-yard lengths
 jumbo paper clips about 5 cm or 2 in long
 meter sticks or yard sticks
 30 centimeter/12 inch rulers
 chart paper
 markers
 pencils
 masking tape
 Student Page K.10.8 LINES

PRODUCTS

paper clip measuring chains
 Comparing String
 Completed Student Pages

PROCEDURES

1. **Part 1. When there is a need to determine if one thing is longer than another, have the students explore and invent ways to compare lengths. Put strings that are a little over a meter long along with such things as crayons, pop cycle or craft sticks, paper clips, sheets of paper, and in an Inventor's Boxes. Have the students work in pairs to solve problems outlined below.**

Guide the inquiry problems through questioning.

- How can we find out which of two things is the longest. How can you tell which partner has the longest arm from elbow to pointer finger tip? or the longest foot? Try your ideas and see.

- Who has the longest arm or foot? How did you find out?
 - ✓ Have the students share their measurement techniques.
 - ✓ Get agreement on the easiest—probably direct comparison.
- How could you find out who has the longest arm in the room?
 - ✓ Have the students share their measurement techniques. .
- How can we find out which is wider, your chair or the top of your table? Its no fair to move furniture. There are some things in the Inventors Box you may want to look at for ideas.
 - ✓ Help them with the concepts of width and length.
 - ✓ If the string is not used, socratically, through questioning, lead one or more groups to use string in making comparisons.
 - ✓ Have the students share their measurement techniques. .
- Which way is the easiest to use? Why?
 - ✓ Work to the idea that the string can be used to compare things of many different lengths.
- How many things can you find in the room that are just about the same length or distance as the width of your chair? Keep tract of the things that you find that are about the same size.
 - ✓ Give them time to measure things and make a list.
 - ✓ If some students have difficulty, again socratically lead those students through questioning to use string in making comparisons.
- How many things did you find?
 - ✓ Have the students share how many things they found.
 - ✓ Have the students share how they made their measurements.
- How can we use a string to compare the lengths of everyone's arm from elbow to pointer finger tip?
- Is the distance around your head about the same as the distance across your chair? Check to see.
- What advantages are their to using a Comparing String over some kind of stick.
- How can you keep a Comparing String so that you can find it whenever you need it?
 - ✓ Get at such things as keeping it in an envelope, plastic bag, and so forth. Have the students make a container. See Activity K.10.3.

✓ The ends of string can kept from fraying by dipping them in glue and letting them dry. Knots can also be tied but this may be difficult for many students at this age.

2. **Part 2. When there is a need to determine how long a thing is introduce measuring units. Put 8 paper clips (see background for discussion of paper clips) and such things as pop cycle or craft sticks, new unsharpened pencils or makers into Inventors Boxes. Have them also take out their Comparing Strings. Have the students work in groups.**

Direct the inquiry through questioning

- Can any group come up with a way to tell others how long the first line on Student Page K.10.8 LINES is? You must tell others how wide it is, not show them. They must be able to do what you did so they can get the same width. You can look in the Inventors box to see if there are things to help you.
 - ✓ Help the students explore the problem.
 - ✓ If no one uses paper clips, socratically guide at least one group of students to use them to make their measurement.
 - ✓ The line will be about 4 Jumbo paper clips long.
- Who has found a way to tell someone else how long the line is? How did you do it?
 - ✓ Have the students repeat the instructions of how to measure from each group as they answer to see if they can get about the same answer.
 - ✓ The second line is about 3 Jumbo paper clips long.
- Now ask, how long is second line,?
 - ✓ Work to get some consistency in answers using paper clips.
 - ✓ The second line is about 3 Jumbo paper clips long.
- How do paper clips helping us find how long something is?
 - ✓ Work to the idea that these paper clips are all same length and you can put them end to end and count how many there are along a line Everyone can get the same answer.
- What did you use a paper clip to measure?
 - ✓ Work to the idea that it measures length or distance. The paper clip is a little piece of distance or *unit* of distance.
- Can anyone name other units of distance, that are used for measuring how long something is?
 - ✓ Make a class list. Likely suggestions are inches, feet, yards, miles, centimeters, meters, meters, kilometers, unifix cubes, centicubes, etc.

- 3. Part 3. When there is a need to determine how long a thing is using standard units introduce the centimeter/inch ruler and the meter stick. Compare the paper clip chain with the metric system.**

Direct the inquiry through questioning.

- What do you use your ruler for?
 - ✓ Get at such things as drawing straight lines and measuring?
- Look at your ruler, can you figure out how you can use it for measuring? Remember or paper clips.
 - ✓ Work to the idea that there are marks on the ruler that are the same distance apart. That the number of marks can be counted. The paper clips were the same distance apart and they were counted to tell us how long something was.
- If the ruler uses both inches and centimeters, ask does anyone knows which side of the ruler is used to measure inches and which side to measure centimeters?
 - ✓ Have the students mark the centimeter side with a piece of tape or sticker.
 - ✓ Point out that we are going to use the big lines by the numbers.
 - ✓ Have the students point to the lines as they count the numbers on their ruler.
- How long is a paper clip?
 - ✓ Help the students measure the paper clip on the ruler.
 - ✓ Work for answers of about 5 centimeters or 2 inches for Jumbos.
- How many jumbo paper clips does it take to measure 25 centimeters?
 - ✓ Help the students to measure the number of jumbo paper clip on the ruler.
 - ✓ Use individual paper clips placed end to end, since the paper clip chain is slightly shortened when clips are overlapped in linking them together.
 - ✓ Work for answers of about 5 paper clips.
- If you have 10 paper clips, how long will they be when you put them end to end? Introduce the meter stick.
 - ✓ Record their answers.
 - ✓ Test their answers using a meter stick.
 - ✓ Work for an answer of about 50 cm.

- About how long is your Comparing String?
 - ✓ Help the students explore.
 - ✓ The answer may be in paper clips (about 20), centimeters (about 100) meters (about 1) or inches (about 40)
 - How can we have more than one answer?
 - ✓ Work to the idea that they all are same measurement but units are of different sizes.
 - What measuring tool would we measure the length of the room with?
 - ✓ Work to the idea of a meter stick or comparing string.
 - How long is half of your Comparing String?
 - ✓ Help the students explore.
 - ✓ If needed help them fold their string in half and compare it with the paper clip chain its 10 paper clips long. compared with the centimeters on the meter stick is 50 centimeters long.
- 4. For field work in the garden and measuring the traffic the traffic simulation tie paper clips on each end of the Comparing String so that the strings can be linked together. Adjust the string lengths so they are 1 meter long including the paper clip. This can be done with the help of older students.**

Ask such questions as these:

- How does your Comparing String compare with a meter?
 - ✓ Test their answers using a meter stick.
- How many centimeters long are your Comparing Strings?
 - ✓ Work for 100 centimeters.
- How could you measure something that is two meters long using Comparing Strings?
 - ✓ Work for the idea of connecting two strings together.
- If you have two string connected together how many centimeters would this be?
 - ✓ Help the students explore.
 - ✓ Test their answers using 2 meter sticks and counting.

EXTENSION

- Make a chart comparing different units of length.



THINGS IN MY
CUBBY
SP K.10.1

Name _____

Date _____

Draw pictures of things in your cubby.

Name _____

Date _____

[illegible]



USING ENVELOPES
SP K.10.3

Name _____

Date _____

Draw pictures of things you could put in each envelope.





PUZZLE PIECES
SP K.10.4

Name _____

Date _____

Cut along dotted lines.

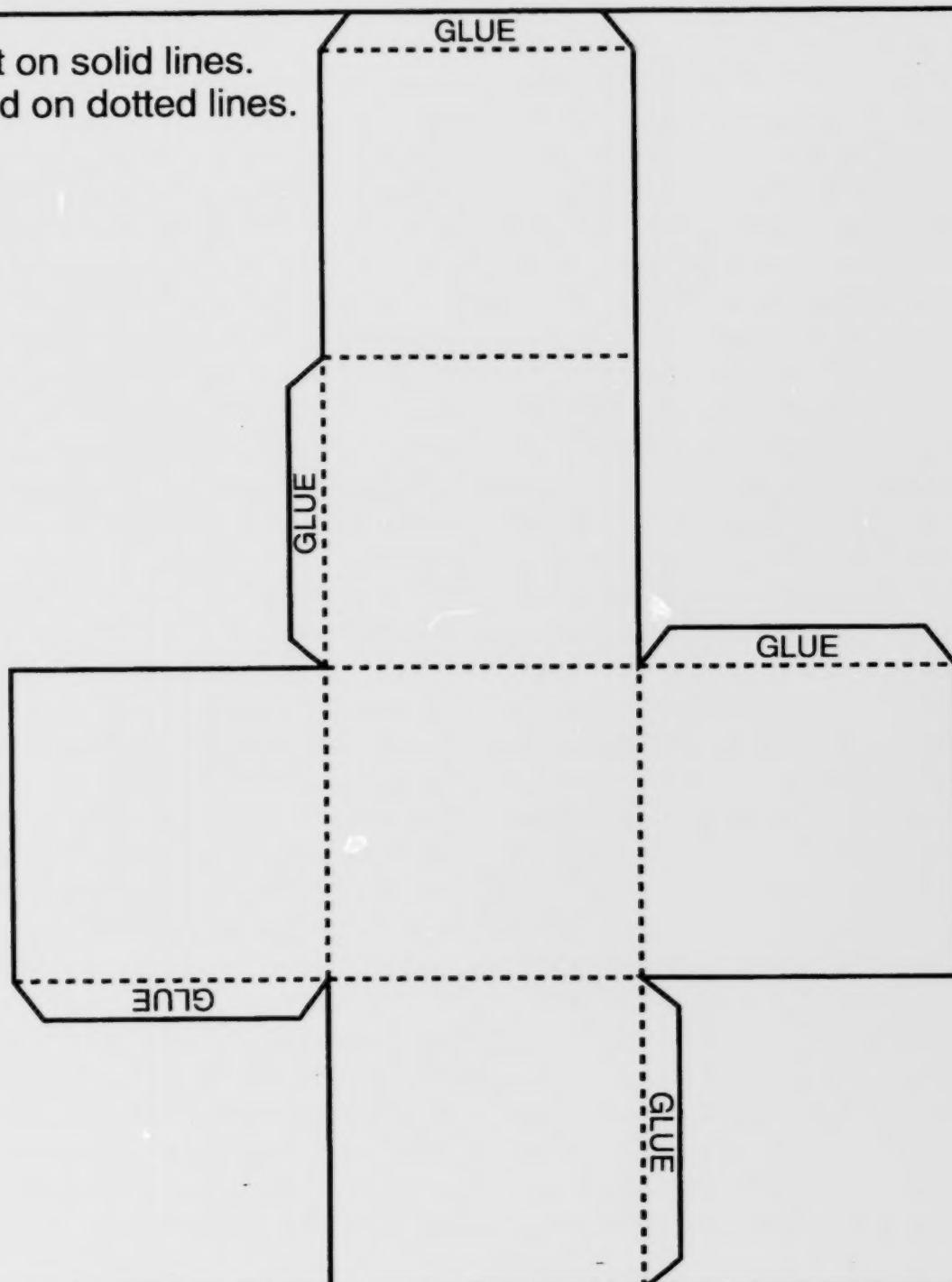


**BOX PATTERN**
SP K.10.5

Name _____

Date _____

Cut on solid lines.
Fold on dotted lines.



Name _____

Date _____

LETTER OF BOX OR BAG	ESTIMATED VOLUME	MEASURED VOLUME



**PACKING AND
STORING
SP K.10.7**

Name _____

Date _____

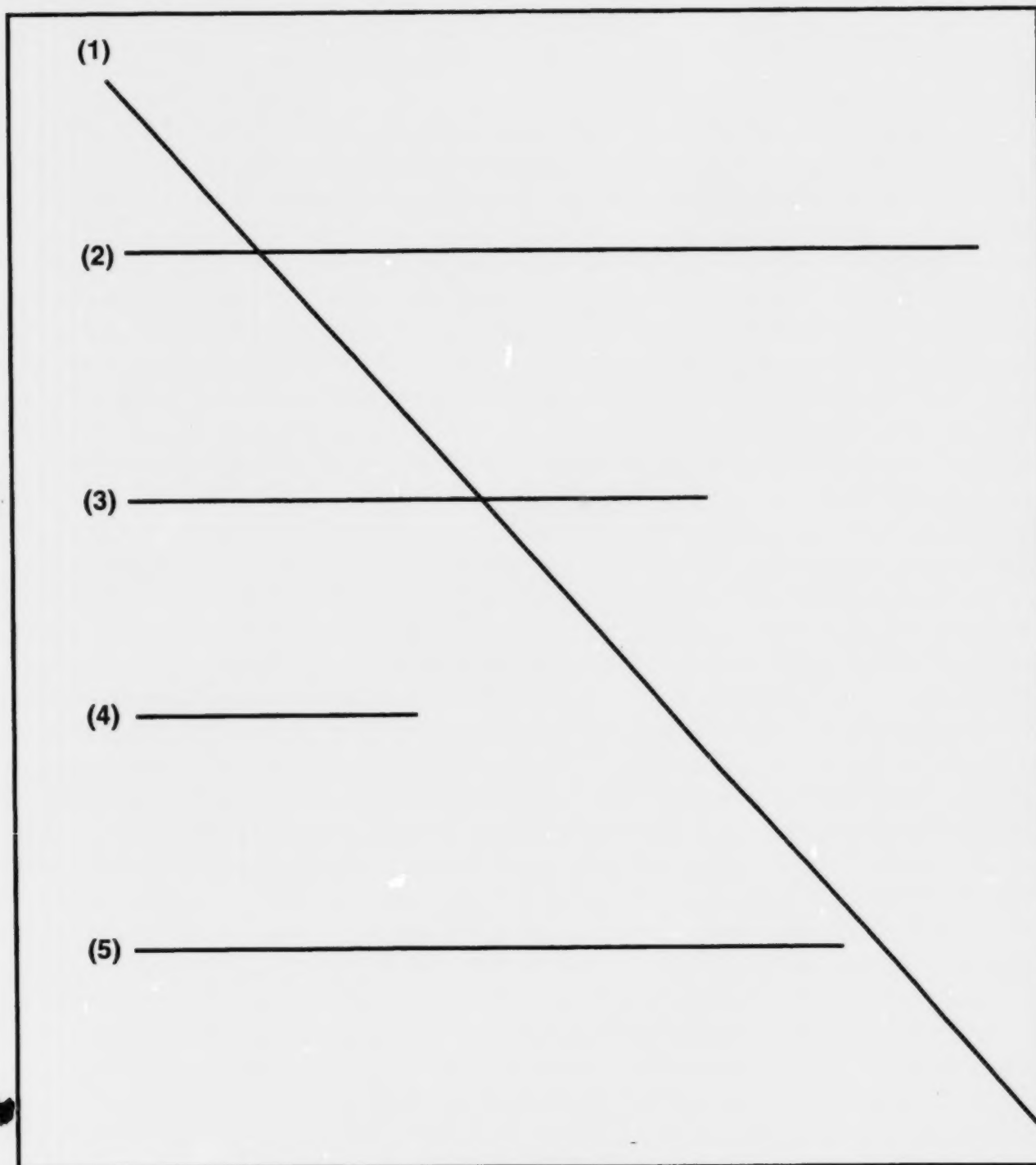
GROUP	NUMBER OF SHEETS USED TO FILL THE BOX	HEIGHT OF PILE



LINES
SP K.10.8

Name _____

Date _____

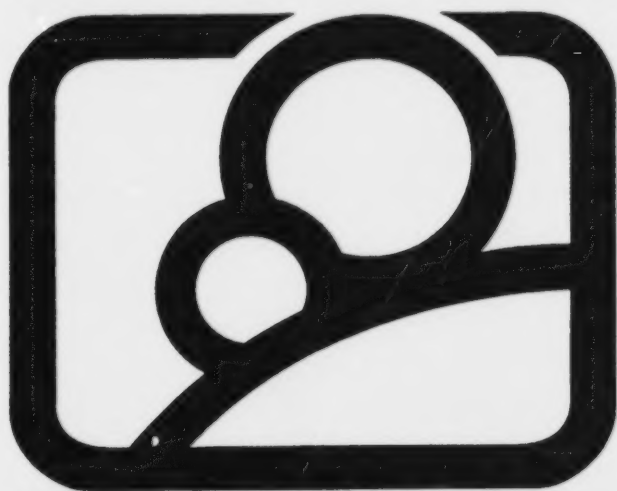




GRADE K

**SUPPORT
MATERIALS**

- **Grade K**
Start-Up Activities



- **DASH**

**Developmental
Approaches in
Science,
Health and Technology**



Curriculum Research & Development Group
University of Hawai'i



GRADE K

ACTIVITY PLANS

Kindergarten DASH: Suggested Year 1 Activity Plan											
CLUSTER	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE
1. Learning	K.1.1-2- LC&RspCt	K.1.1-2-3 K.1.5-SRB K.1.11-WD (K.1.15-16)	K.1.1-2 K.1.6-10- Classif	K.1.1-2-3	K.1.1-2 K.1.13 (14)	K.1.1-2-3 K.1.14	K.1.1-2 (K.2.6-7 Moon)	K.1.1-2-3	K.1.1-2	K.1.1-2	K.1.1-2,3 K.1.14 K.1.18
2. Time, Weather, & Sky	K.2.1- W Logos	K.2.1-Tem K.2.8-Fall	K.2.1-Wind		K.2.8-Wint	K.2.2-4- Beg,End Day&Nt		K.2.8-Spg		K.2.5- Graph K.2.8-Sum (K.2.9)	
3. Animals		K.3.1-3- Pets	K.3.4-5- Classif (K.3.6) (K.3.16-7)					K.3.12-15 Needs		(K.3.8-11- Insects)	
4. Plants									K.4.1- PlantParts K.4.4-5- Bean Spts		
5. Food and Nutrition									K.5.1-Eat Bean Spts K.5.4- Fam Food		
6. Health and Safety	K.6.1- Gwth Cht	K.6.8- Aprons (K.6.21- Lost)		K.6.21			K.6.2, (3) K.6.5-7 K.6.9-10				K.6.1
7. Way-finding				K.7.1-4 K.7.8-9							
8. Energy & Communi-cation						K.8.1 K.8.4-5					
9. Conserv., Recycling, & Decompos.			(K.9.3- Recyc)					K.9.1- Decomp			
10. Matter, Space, & Construction			K.10.1-Org				K.10.3- MkEnv	K.10.8- Lin Meas (or w/math)			
NOTES	Learn Cal Records Start Up	Learning Weather Pets (Friends)	Classif.	Directions Safety	(Family)	Time Energy	Teeth Health (Moon)	Animal Needs Decomp (Meas)	Plants Food	(Insects) Catch-Up	Finish Up

Kindergarten DASH: Suggested Full Implementation Activity Plan											
CLUSTER	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE
1. Learning	K.1.1-2- LC&RspCt	K.1.1-2,3 K.1.5-SRB K.1.11-WD K.1.15-16	K.1.1-2 K.1.6-10- Classif	K.1.1-2,3	K.1.1-2 K.1.13-14 Family K.1.4-HCal	K.1.1-2,3 (K.1.18)	K.1.1-2 (K.1.12- CB)	K.1.1-2,3	K.1.1-2	K.1.1-2	K.1.1-2,3 K.1.18
2. Time, Weather, & Sky	K.2.1- W Logos	K.2.1-Tem K.2.8-Fall	K.2.1-Wind		K.2.8-Wint	K.2.2-4- Beg, End Day&Nt	K.2.6-7 Moon	K.2.8-Spg		K.2.8-Sum K.2.5-Grph K.2.9- Clk&Cal	
3. Animals		K.3.1-3- Pets	K.3.4-5- Classif K.3.6,16-7 Anim Env,					K.3.12-15 Needs K.3.7- AnUses	K.3.8-11- Insects		
4. Plants									K.4.1-6 PlantParts Bean Spils Garden		
5. Food and Nutrition				K.5.2-6- Food	K.5.2-6- Food				K.5.1-Eat Bean Spils		
6. Health and Safety	K.6.1- Grwth Cht	K.6.8- Aprons K.6.5-7,9 Germs		K.6.21- Lost		K.6.18- Wrmlnside	K.6.2, (3) Teeth K.6.10-14- Sick/Dr.	K.6.15-17, 20-Raincts (K.6.10-14- Sick/Dr.)		K.6.19- Cool Inside	K.6.1- GrwthCt
7. Way-finding				K.7.1-4 K.7.8-9 K.7.7- Home Loc			K.7.5-6- Moon rs/st			K.7.10-11- Traffic Sim. K.7.12- Mapping	
8. Energy & Communication						K.8.1-6 Energy					
9. Conserv., Recycling, & Decompos.			K.9.3-Recy in clsm					K.9.1- Decomp		K.9.3-4 Recyc Mk Paper	
10. Matter, Space, & Construction			K.10.1-Org				K.10.1-7 Pattn&Vol	K.10.8- Lin Meas (or w/math)			
NOTES	Learn Cal Records Start Up	Friends Weather Pets Germs	Classif.	Directions Safety (Food)	Food Family	Time Energy	Teeth Health Volume Moon	Annl Nds (Health) Decomp LinMeas.	Plants (Garden) Insects	Traffic Sim. Time: Summary	Finish Up

DASH Activities School Year Planning Form											
CLUSTER	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE
1. Learning											
2. Time, Weather, & Sky											
3. Animals											
4. Plants											
5. Food and Nutrition											
6. Health and Safety											
7. Way-finding											
8. Energy & Communication											
9. Conserv., Recycling, & Decompos.											
10. Matter, Space, & Construction											
NOTES and ORGANIZING IDEAS											



GRADE 2

SCOPE & SEQUENCE

ACTIVITY LISTS

GRADES K-5 DASH SCOPE AND SEQUENCE OF ACTIVITIES

CLUSTER	GRADE K	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5
Learning	Learning Calendar Home Learning Calendar Calendar Review Responsibility Chart Science Record Book Using Our Senses Same and Different Physical Characteristics Functions of Things Working Dictionary Wonder and Discover Book Connections Book Families Families and Helping Making Friends Being Friends School and Home Concept and Skill Inventory	Learning Calendar Responsibility Chart Planning Calendar Last Year Helping Working Together Taking Turns and Sharing Concept and Skill Inventory	Learning Calendar Last Year Aphorisms Helping Others Getting Help Making and Keeping Turns School, Teacher, Friends, and Family Predictions about Tomorrow Planning for Tomorrow Thinking Library Concept and Skill Inventory	Learning Calendar Last Year Responsibility Planning Organizing Our Environment Friends Giving and Receiving Working Together Helping Myself and Others Aphorisms Next Year Science & Technology Concept and Skill Inventory	Learning Calendar Responsibility Last Year Library Working Together Things I Can Do for Myself and Others Aphorisms Friendship Concept and Skill Inventory	Learning Calendar Responsibility Library Working Together Things I Can Do for Myself and Others Aphorisms Friendship Concept and Skill Inventory
Time, Weather, and Sky	Weather Watch Beginnings Endings Day and Night Days, Weeks, and Months Moon Watch Moon Phases Seasons Clocks and Calendars	Sky and Weather Watch Rain and Streams Snow and Streams Digital Clock Hours and Minutes Time Line Sunrise and Sunset Night and Day The Sun The Seasons Making a Clock Moonrise & Moonset	Temperature Wind Sunrise, Sunset, and Seasons Moonrise and Moonset Rain Snow Digital Time Analog Time	Weather Temperature Wind Rain and Snow Humidity Sunrise and Sunset Moon Phases Polar Sky Model Polar Constellations Venus Eclipses	Rainfall and Snowfall Wind Direction & Speed Height of Clouds Clouds and Weather Storm Clouds Humidity and Wind Chill Lightning Weather Maps Weather Fronts Predicting Weather Flat or Round Earth? Length of Day and Night The Sun's Shadow Path The Planetarium Planets When Is It Noon? Making and Using a Sundial Seasons and the Sun Moon Phases and the Sun Sun Eclipses	Weather Station Heat Index Weather Prediction Clouds and Fronts Triangles Gnomon Size of Earth Moon Through a Telescope How Big and Far Away Is the Moon? Paths of Celestial Bodies Models of the Solar System

GRADES K-5 DASH SCOPE AND SEQUENCE OF ACTIVITIES

CLUSTER	GRADE K	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5
Animals	Appropriate Pets Classroom Animals Caring for Animals Living, Once-living, and Nonliving Things Animals and Plants Animal Environments Uses for Animals How Bugs Walk Parts of Bugs Parts of Mammals People Animals and Food Animals and Water Animals and Air Animal Wastes How Animals Keep Warm How Animals Keep Cool Real or Imaginary	Classroom Pets Living & Nonliving Things Defining Living and Nonliving Things Animal Survey Animal Key Animal Needs Planning to Raise a Small Animal Building Cages Metamorphosis	Classroom Pets Classroom Aquarium External Anatomy of Fish Biological Needs of Fish Reproduction and Development of Fish Finding Insect Eggs Hatching Insect Eggs Early Metamorphosis Late Metamorphosis Collecting Spiders Insects and Spiders Spider Food Spider Care Spiders as Predators Spider Webs	Classroom Pets Raising Insects Comparing Insects Importance of Insects Frog and Toad Habitats Raising Frogs and Toads Frog Metamorphosis Importance of Frogs and Toads Toads and Insects Hatching Chicks Chick Growth Importance of Birds	Pet Care Unincubated Egg Chick Embryology Raising Small Mammals Reproduction of Pet Mammals Pet Baby Care Our Early Years The First Grade Child Development of Pets Human Development Changing Dimensions Anatomy of Fish Fish Reproduction Digestive, Circulatory, and Reproductive Systems Migration and Hibernation Fall, Winter, and Spring Birds	Pet Care Birds I Know Cells Male Urogenital System Female Urogenital System Ovulation Cycle Ovulation and Pregnancy Embryology Body Changes Bones Skeletal System Muscles Muscular System Chemistry and Bones The Senses The Eye Sound The Ear
Plants	Plant Parts Plant Environment Plant Uses Growing Bean Sprouts Plants and Water Gardening	Plant Identification Plant Survey Plant Pressing Plant Key Plant Needs Plant Life Cycle Edible Plant Parts Plant Parts Animals Eat	Soil Making Soil Soil and Plants Soil Uses Finding Soil Pipes and Water Moving Water: Gravity Moving Water: Pumps Vegetable and Flower Gardens in a Bucket Rooting Stems Rooting Bulbs and Tubers Roots and Water Growing Root Vegetables Tree Planting	Garden Planning Garden Preparation Watching Garden Soil Making Artificial Soil Testing Soil Soil and Water Garden Planting Garden Care Watering Systems Garden Invaders Controlling Insects Garden Harvesting Flowers Seeds Pollination	Annual, Biennial, and Perennial Plants Fungi	Annual, Biennial, and Perennial Plant Project Tree Harvesting Tree Planting Tree Observation Measuring Trees Age of Trees Trees, Shrubs, and Grasses Grasses: Why Do They Grow There? Roots Soil Conservation
Food and Nutrition	Bean Sprout Salad Drinks Flour and Bread Familiar Foods Favorite Foods New Foods Garden Snack Foods	Food Groups Cooking Measuring Volume	Supermarket Survey Food Preference Food Groups New Foods Properties of Foods Changing Flavor Milk, Butter, and Cheese Energy from Food	Nutritious Food Selection Plants for the Garden Class Feast Drying and Pickling Foods Preserving and Rotting Supermarket Game Pricing Foods Food Ads	Nutrients Mechanical Digestion Chemical Digestion Food Groups Preserving Foods	Nutrients Nutrients and Cells Food Labeling

GRADES K-5 DASH SCOPE AND SEQUENCE OF ACTIVITIES

CLUSTER	GRADE K	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5
Health and Safety	Growth Chart Tooth Chart Tooth Care Exercise Germs Washing Hands Bathrooms and Basins Aprons Fountains and Faucets Getting Sick Feeling Sick Going to the Doctor What Doctors Do Going to the Hospital Raincoats Testing Raincoats Wet and Cold Keeping Warm Indoors Hand and Foot Protection Getting Lost	Growth Chart Tooth Chart Brushing Teeth Chewing Air and Breathing Getting Hurt Staying Healthy Safety Rules	Growth Chart Tooth Chart Tooth Care Getting Hurt Getting Sick Staying Well Classroom and Playground Safety Fire Safety Using 911	Growth Chart Tooth Chart Breathing Air Anatomy of Breathing Lung Model Lungs and Smoking Breathing and Pulse Heart, Veins, and Arteries Heart, Lungs, and Exercise Disease Transmission Trash and Sanitation Helpful Drugs Proper Drug Use	Growth Chart and Area Measurement Tooth Chart Safety Gear Safety and Putting Out Fires Making a Fire Things That Burn Smoking and the Lungs Alcohol, Tobacco, and Drugs	Growth Chart and Area Measurement Tooth Chart Alcohol, Tobacco, and Drugs Sexually Transmitted Diseases Safety Devices Smokers' Surveys Smoking Laws Alcohol Laws Chris's Story The Parents' Story Intoxication Drug Laws
Wayfinding and Transportation	Right and Left Sunrise Sunset North and South Home Location Sidewalks & Walkways Roads Traffic Simulation Equipment Traffic Simulation Mapping Traffic Rules Classroom Mapping	Pacing North, South, East, and West Home Map Distance Making a Boat Making a Lake The Great Regatta Floating and Sinking Draining a Lake	Transportation Systems Making Race Cars Racing Cars Roads Building a Village Pedestrians in the Village Bikes in the Village Cars in the Village Bikes and Trikes Belts and Pulleys Fast and Slow Pulleys Gears and Wheels	Garden Mover Propeller-Driven Message Center Propeller-driven Boat Delivery Systems	Boat Design Wind and Sails	Where in the World Are We? Planetarium Mapping the Sky The North Pole Equator, and Ecliptic Where is Earth?

GRADES K-5 DASH SCOPE AND SEQUENCE OF ACTIVITIES

CLUSTER	GRADE K	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5
Energy and Communication	Energy Making Things Move Making Things Stop Turning Things Off Turning Things On Repairing Things	Temperature of Things Master Thermometer Hot and Cold Sources of Energy	Sun and Direction Mirrors and Sunlight Clouds and Sunlight Comparing Temperatures Eclipses	Shadow, Light, and Bubbles Wind and Heat Wind Pulls and Pushes Propellers Driving Propellers Waterwheels Propellers in Water Heliograph Speaking Tube String Telephone Energy Definitions	Push-Pull Measuring Tool Friction Streamlining Pressure, Sharp Edges, and Points Energy of Falling Objects Circles and Speed	Pushes, Pulls, & Forces Teeter-Totters The Balance Wheels and Axles Levers Arms and Jaws Inclined Planes and Screws Block and Tackle Magnetic Pushes and Pulls Magnets and Compasses Magnetic Fields Forces Projects
Conservation, Recycling, and Decomposition	Decomposition Waste Disposal Recycling Project Making Paper	Classroom Resources Conserving Energy Conserving Water Decomposition and Unearthing Decomposition and Reburial Recycling	Fall Unearthing Fall Burying Spring Unearthing Spring Burying Pollution Survey Aluminum Recycling Connections	Making Compost Watching Compost Animals in Compost Using Compost Fall Unearthing and Burial Spring Unearthing and Burial	Unearthing and Burial Recycling Project	Class Recycling Project Class Conservation Project Decomposition and Archeology Pollution Project
Matter, Space, and Construction	Cubby Organization Patterns in Puzzles Making Puzzles Making Envelopes Making Boxes and Bags Volume of Boxes and Bags Packing and Storing Linear Measurement	Meter-string Can Outdoor Study Area Mapping Testing for Water Measuring Volume Plumbing Water Systems Air Bubbles in Water and Air Building with Air Floor Plan Cardboard House Plan Making a Cardboard House Painting the House Furnishing the House Sewing and Weaving Warming and Cooling Lighting the House Safety Equipment	Desk Organization Notebook Organization The Balance Meter-string Can Measuring Volume Safety Equipment	Acidic and Basic Soil Acids and Bases Acid and Base Reactions Diluting Acids and Bases Acid and Base Interactions Dissolving Things Things in Liquids Crystals Rain in a Jar Supermarket Planning Supermarket Construction Measuring Devices Safety Equipment	Linear Measurement Volume Measurement Mass Measurement Collecting Rocks Hardness of Rocks Specific Gravity Rocks and Sharp Edges Making Tools from Rock Clowns: Things That Float Clay Fire and Pottery Air and Fire Fire and Oxygen Properties of Gas	Linear Measurement Volume Measurement Mass Measurement Camera Obscura Controlling Light with Lenses Making a Telescope Stabilizing the Telescope Making a Microscope Making a Hygrometer Making a Barometer

GRADE 6 SCOPE AND SEQUENCE OF ACTIVITIES

Learning	Time, Weather, and Sky	Animals	Plants	Food and Nutrition
Learning Calendar Last Year Mars Mission Tomorrow The Work World Goals Crash Simulation Mars Compact Martian Simulation The Mission Conference Concept and Skill Inventory	Weather Station Weather Around the United States Weather and Local Climate Wind Hypotheses Producing Winds Air Pressure and Altitude Wind and Water Altitude and Temperature Models of Air Climatic Regions Climate of Mars	Animal Care Raising Fish Raising Worms Food Chains	Hydroponics Algae Nutrients and Biological Waste Water Pollutants	Nutrient Tables The Kilocalorie Weight Watching Meal Planning Food for Space Fish for Dinner
Health and Safety	Wayfinding and Transportation	Energy and Communication	Conservation, Recycling, and Decomposition	Matter, Space, and Construction
Growth Chart Tooth Chart Safety Disease Literature Sanitation Disease Prevention and Treatment Sexually Transmitted Diseases Drug Abuse Prevention and Treatment Alcohol and Tobacco Environmental Disease Transmission, Prevention, and Treatment Exercise and Health and the Mars Mission	Flying Airplanes Flying Rockets Spacecraft The Orbit of Mars What Path to Mars?	Rocket Propulsion Magnetism Electrostatics Electrical Circuits Rock Formation Metals from Ores Asymmetrical Levers	Recycling Project Conservation Decomposition: A Summary Pollution	Making Measuring Equipment Making a Balance Making an Electroscope Making Electromagnets and Current Indicators Making Electric Cells Making an Electric Motor Making an Electric Signaler Making a Martian Survival Habitat

GRADE K

CLUSTER 1 LEARNING

- K.1.1 THE LEARNING CALENDAR
- K.1.2 THE CLASS RESPONSIBILITY CHART
- K.1.3 CALENDAR REVIEW
- K.1.4 THE HOME LEARNING CALENDAR
- K.1.5 THE SCIENCE RECORD BOOK
- K.1.6 USING OUR SENSES
- K.1.7 SAME AND DIFFERENT
- K.1.8 PHYSICAL CHARACTERISTICS OF THINGS
- K.1.9 FUNCTIONS OF THINGS
- K.1.10 THE WORKING DICTIONARY AND WORKING DEFINITIONS
- K.1.11 THE WONDER AND DISCOVER BOOK
- K.1.12 THE CONNECTIONS BOOK
- K.1.13 FAMILIES
- K.1.14 FAMILIES AND HELPING
- K.1.15 MAKING FRIENDS
- K.1.16 BEING FRIENDS
- K.1.17 SCHOOL AND HOME
- K.1.18 CONCEPT AND SKILL INVENTORY

CLUSTER 2 TIME, WEATHER, AND SKY

- K.2.1 WEATHER WATCH
- K.2.2 BEGINNINGS
- K.2.3 ENDINGS
- K.2.4 DAY AND NIGHT
- K.2.5 DAYS, WEEKS, AND MONTHS
- K.2.6 MOON WATCH
- K.2.7 MOON PHASES
- K.2.8 SEASONS
- K.2.9 CLOCKS AND CALENDARS

CLUSTER 3 ANIMALS

- K.3.1 APPROPRIATE PETS
- K.3.2 CLASSROOM ANIMALS
- K.3.3 CARING FOR CLASSROOM ANIMALS
- K.3.4 LIVING, ONCE-LIVING, AND NON-LIVING
- K.3.5 ANIMALS AND PLANTS
- K.3.6 ANIMAL ENVIRONMENTS
- K.3.7 USES FOR ANIMALS
- K.3.8 HOW BUGS WALK
- K.3.9 PARTS OF BUGS
- K.3.10 PARTS OF MAMMALS
- K.3.11 PEOPLE
- K.3.12 ANIMALS AND FOOD
- K.3.13 ANIMALS AND WATER
- K.3.14 ANIMALS AND AIR
- K.3.15 ANIMAL WASTES
- K.3.16 HOW ANIMALS KEEP WARM
- K.3.17 HOW ANIMALS KEEP COOL
- K.3.18 REAL OR IMAGINARY

CLUSTER 4 PLANTS

- K.4.1 PLANT PARTS
- K.4.2 PLANT ENVIRONMENTS
- K.4.3 PLANT USES
- K.4.4 GROWING BEAN SPROUTS
- K.4.5 PLANTS AND WATER
- K.4.6 GARDENING

CLUSTER 5 FOOD AND NUTRITION

- K.5.1 BEAN SPROUT SALAD
- K.5.2 DRINKS
- K.5.3 FLOUR AND BREAD
- K.5.4 FAMILIAR FOODS
- K.5.5 FAVORITE FOODS
- K.5.6 NEW FOODS
- K.5.7 SNACKS FROM THE GARDEN

CLUSTER 6 HEALTH AND SAFETY

- K.6.1 GROWTH CHART
- K.6.2 TOOTH CHART
- K.6.3 TOOTH CARE
- K.6.4 EXERCISE
- K.6.5 GERMS
- K.6.6 WASHING HANDS
- K.6.7 BATHROOMS AND BASINS
- K.6.8 APRONS
- K.6.9 FOUNTAINS AND FAUCETS
- K.6.10 GETTING SICK
- K.6.11 FEELING SICK
- K.6.12 GOING TO THE DOCTOR
- K.6.13 WHAT DOCTORS DO
- K.6.14 GOING TO THE HOSPITAL
- K.6.15 RAINCOATS
- K.6.16 TESTING RAINCOATS
- K.6.17 WET AND COLD
- K.6.18 KEEPING WARM INDOORS
- K.6.19 KEEPING COOL INDOORS
- K.6.20 HAND AND FOOT PROTECTION
- K.6.21 GETTING LOST

CLUSTER 7 WAYFINDING AND TRANSPORTATION

- K.7.1 RIGHT AND LEFT
- K.7.2 SUNRISE
- K.7.3 SUNSET
- K.7.4 NORTH AND SOUTH
- K.7.5 HOME LOCATION
- K.7.6 SIDEWALKS AND WALKWAYS
- K.7.7 ROADS
- K.7.8 TRAFFIC SIMULATION EQUIPMENT
- K.7.9 TRAFFIC SIMULATION MAPPING
- K.7.10 TRAFFIC RULES
- K.7.11 CLASSROOM MAPPING

CLUSTER 8 ENERGY AND COMMUNICATION

- K.8.1 ENERGY
- K.8.2 MAKING THINGS MOVE
- K.8.3 MAKING THINGS STOP
- K.8.4 TURNING THINGS OFF
- K.8.5 TURNING THINGS ON
- K.8.6 REPAIRING THINGS

CLUSTER 9 CONSERVATION, RECYCLING, AND DECOMPOSITION

- K.9.1 DECOMPOSITION
- K.9.2 WASTE DISPOSAL
- K.9.3 RECYCLING PROJECT
- K.9.4 MAKING PAPER

CLUSTER 10 MATTER, SPACE, AND CONSTRUCTION

- K.10.1 CUBBY ORGANIZATION
- K.10.2 PATTERNS IN PUZZLES
- K.10.3 MAKING ENVELOPES
- K.10.4 MAKING PUZZLES
- K.10.5 MAKING BOXES AND BAGS
- K.10.6 VOLUME OF BOXES AND BAGS
- K.10.7 PACKING AND STORING
- K.10.8 LINEAR MEASUREMENT

GRADE 1

CLUSTER 1 LEARNING

- 1.1.1 THE LEARNING CALENDAR
- 1.1.2 THE RESPONSIBILITY CHART
- 1.1.3 THE PLANNING CALENDAR
- 1.1.4 THINGS LEARNED LAST YEAR
- 1.1.5 HELPING
- 1.1.6 WORKING TOGETHER
- 1.1.7 TAKING TURNS AND SHARING
- 1.1.8 CONCEPT AND SKILL INVENTORY

CLUSTER 2 TIME, WEATHER, AND SKY

- 1.2.1 SKY AND WEATHER WATCH
- 1.2.2 RAIN AND STREAMS
- 1.2.3 SNOW AND STREAMS
- 1.2.4 THE DIGITAL CLOCK
- 1.2.5 HOURS AND MINUTES
- 1.2.6 TIME LINE
- 1.2.7 SUNRISE AND SUNSET
- 1.2.8 NIGHT AND DAY
- 1.2.9 THE SUN
- 1.2.10 THE SEASONS
- 1.2.11 MAKING A CLOCK
- 1.2.12 MOONRISE AND MOONSET

CLUSTER 3 ANIMALS

- 1.3.1 LIVING AND NON-LIVING THINGS
- 1.3.2 DEFINING LIVING AND NON-LIVING THINGS
- 1.3.3 ANIMALS SURVEY
- 1.3.4 ANIMALS KEY
- 1.3.5 ANIMALS NEEDS
- 1.3.6 PLANNING TO RAISE A SMALL ANIMAL
- 1.3.7 BUILDING CAGES
- 1.3.8 METAMORPHOSIS
- 1.3.9 CLASSROOM PETS

CLUSTER 4 PLANTS

- 1.4.1 PLANT IDENTIFICATION
- 1.4.2 PLANT SURVEY
- 1.4.3 PLANT PRESSING
- 1.4.4 PLANT KEY
- 1.4.5 PLANT NEEDS
- 1.4.6 PLANT LIFE CYCLE
- 1.4.7 EDIBLE PLANT PARTS
- 1.4.8 PLANT PARTS ANIMALS EAT

CLUSTER 5 FOOD AND NUTRITION

- 1.5.1 BASIC THREE FOOD GROUPS
- 1.5.2 COOKING
- 1.5.3 MEASURING VOLUME

CLUSTER 6 HEALTH AND SAFETY

- 1.6.1 GROWTH CHART
- 1.6.2 TOOTH CHART
- 1.6.3 BRUSHING TEETH
- 1.6.4 CHEWING
- 1.6.5 AIR AND BREATHING
- 1.6.6 GETTING HURT
- 1.6.7 STAYING HEALTHY
- 1.6.8 SAFETY RULES

CLUSTER 7 WAYFINDING AND TRANSPORTATION

- 1.7.1 PACING
- 1.7.2 NORTH, SOUTH, EAST, AND WEST
- 1.7.3 HOME
- 1.7.4 MAP DISTANCE
- 1.7.5 MAKING A BOAT
- 1.7.6 MAKING A LAKE
- 1.7.7 THE GREAT REGATTA
- 1.7.8 FLOATING AND SINKING
- 1.7.9 DRAINING A LAKE

CLUSTER 8 ENERGY AND COMMUNICATION

- 1.8.1 TEMPERATURE OF THINGS
- 1.8.2 THE MASTER THERMOMETER
- 1.8.3 HOT AND COLD
- 1.8.4 SOURCES OF ENERGY

CLUSTER 9 CONSERVATION, RECYCLING, AND DECOMPOSITION

- 1.9.1 CONSERVING CLASSROOM RESOURCES
- 1.9.2 CONSERVING ENERGY
- 1.9.3 CONSERVING WATER
- 1.9.4 DECOMPOSITION AND UNEARTHING
- 1.9.5 DECOMPOSITION AND REBURIAL
- 1.9.6 RECYCLING

CLUSTER 10 MATTER, SPACE, AND CONSTRUCTION

- 1.10.1 METER-STRING CAN
- 1.10.2 OUTDOOR STUDY AREA MAPPING
- 1.10.3 TESTING FOR WATER
- 1.10.4 PLUMBING
- 1.10.5 WATER SYSTEMS
- 1.10.6 AIR
- 1.10.7 BUBBLES IN WATER
- 1.10.8 BUBBLES IN AIR
- 1.10.9 BUILDING WITH AIR
- 1.10.10 FLOOR PLAN
- 1.10.11 FLOOR PLAN MODEL
- 1.10.12 CARDBOARD HOUSE PLAN
- 1.10.13 MAKING A CARDBOARD HOUSE
- 1.10.14 PAINTING THE HOUSE
- 1.10.15 FURNISHING THE HOUSE
- 1.10.16 SEWING
- 1.10.17 WEAVING
- 1.10.18 WARMING AND COOLING THE HOUSE
- 1.10.19 LIGHTING THE HOUSE
- 1.10.20 SAFETY EQUIPMENT

GRADE 2

CLUSTER 1 LEARNING

- 2.1.1 THE LEARNING CALENDAR
- 2.1.2 LAST YEAR
- 2.1.3 APHORISMS
- 2.1.4 HELPING MYSELF AND OTHERS
- 2.1.5 GETTING HELP
- 2.1.6 MAKING AND KEEPING FRIENDS
- 2.1.7 TURNS
- 2.1.8 SCHOOL, TEACHER, FRIENDS, AND FAMILY
- 2.1.9 PREDICTIONS ABOUT TOMORROW
- 2.1.10 PLANNING FOR TOMORROW
- 2.1.11 THINKING
- 2.1.12 LIBRARY
- 2.1.13 CONCEPT AND SKILL INVENTORY

CLUSTER 2 TIME, WEATHER, AND SKY

- 2.2.1 TEMPERATURE
- 2.2.2 WIND
- 2.2.3 SUNRISE, SUNSET, AND SEASONS
- 2.2.4 MOONRISE AND MOONSET
- 2.2.5 RAIN
- 2.2.6 SNOW
- 2.2.7 DIGITAL TIME
- 2.2.8 ANALOG TIME

CLUSTER 3 ANIMALS

- 2.3.1 THE CLASSROOM AQUARIUM
- 2.3.2 EXTERNAL ANATOMY OF FISH
- 2.3.3 BIOLOGICAL NEEDS OF FISH
- 2.3.4 REPRODUCTION AND DEVELOPMENT OF FISH
- 2.3.5 FINDING INSECT EGGS
- 2.3.6 HATCHING INSECT EGGS
- 2.3.7 EARLY METAMORPHOSIS
- 2.3.8 LATE METAMORPHOSIS
- 2.3.9 COLLECTING SPIDERS
- 2.3.10 SPIDER FOOD
- 2.3.11 SPIDER CARE
- 2.3.12 SPIDERS AS PREDATORS
- 2.3.13 SPIDER WEBS
- 2.3.14 CLASSROOM PETS

CLUSTER 4 PLANTS

- 2.4.1 SOIL
- 2.4.2 MAKING SOIL
- 2.4.3 SOIL AND PLANTS
- 2.4.4 SOIL USES
- 2.4.5 FINDING SOIL
- 2.4.6 PIPES AND WATER
- 2.4.7 MOVING WATER WITH GRAVITY
- 2.4.8 MOVING WATER WITH PUMPS
- 2.4.9 VEGETABLE GARDEN IN A BUCKET
- 2.4.10 FLOWER GARDEN IN A BUCKET
- 2.4.11 PLANTS AND SUNLIGHT
- 2.4.12 ROOTING STEMS
- 2.4.13 ROOTING BULBS AND TUBERS
- 2.4.14 ROOTS AND WATER
- 2.4.15 GROWING ROOT VEGETABLES
- 2.4.16 TREE PLANTING

CLUSTER 5 FOOD AND NUTRITION

- 2.5.1 SUPERMARKET SURVEY
- 2.5.2 FOOD PREFERENCES
- 2.5.3 BASIC THREE FOOD GROUPS
- 2.5.4 NEW FOODS
- 2.5.5 IDENTIFYING PROPERTIES OF VEGETABLES
- 2.5.6 CHANGING FLAVOR
- 2.5.7 MILK
- 2.5.8 BUTTER
- 2.5.9 CHEESE
- 2.5.10 ENERGY FROM FOOD

CLUSTER 6 HEALTH AND SAFETY

- 2.6.1 GROWTH CHART
- 2.6.2 TOOTH CHART
- 2.6.3 TOOTH CARE
- 2.6.4 GETTING HURT
- 2.6.5 GETTING SICK
- 2.6.6 STAYING WELL
- 2.6.7 CLASSROOM AND PLAYGROUND SAFETY
- 2.6.8 FIRE SAFETY
- 2.6.9 USING 911

CLUSTER 7 WAYFINDING AND TRANSPORTATION

- 2.7.1 TRANSPORTATION SYSTEMS
- 2.7.2 MAKING RACE CARS
- 2.7.3 RACING AND MODIFYING CARS
- 2.7.4 ROADS
- 2.7.5 BUILDING A VILLAGE
- 2.7.6 PEDESTRIANS IN THE VILLAGE
- 2.7.7 BIKES IN THE VILLAGE
- 2.7.8 CARS IN THE VILLAGE
- 2.7.9 BIKES AND TRIKES
- 2.7.10 BELTS AND PULLEYS
- 2.7.11 FAST AND SLOW PULLEYS
- 2.7.12 GEARS AND WHEELS

CLUSTER 8 ENERGY AND COMMUNICATION

- 2.8.1 CAMERA OBSCURA
- 2.8.2 MIRRORS AND SUNLIGHT
- 2.8.3 CLOUDS AND SUNLIGHT
- 2.8.4 COMPARING TEMPERATURES
- 2.8.5 ECLIPSES

CLUSTER 9 CONSERVATION, RECYCLING, AND DECOMPOSITION

- 2.9.1 FALL UNEARTHING
- 2.9.2 FALL BURYING
- 2.9.3 SPRING UNEARTHING
- 2.9.4 SPRING BURYING
- 2.9.5 POLLUTION SURVEY AND CLEANUP
- 2.9.6 ALUMINUM RECYCLING
- 2.9.7 CONNECTIONS

CLUSTER 10 MATTER, SPACE, AND CONSTRUCTION

- 2.10.1 DESK ORGANIZATION
- 2.10.2 NOTEBOOK ORGANIZATION
- 2.10.3 THE BALANCE
- 2.10.4 METER-STRING CAN
- 2.10.5 MEASURING VOLUME
- 2.10.6 SAFETY EQUIPMENT

GRADE 3

CLUSTER 1 LEARNING

- 3.1.1 THE LEARNING CALENDAR
- 3.1.2 LAST YEAR
- 3.1.3 RESPONSIBILITY
- 3.1.4 PLANNING
- 3.1.5 ORGANIZING OUR ENVIRONMENT
- 3.1.6 FRIENDS
- 3.1.7 GIVING AND RECEIVING
- 3.1.8 WORKING TOGETHER
- 3.1.9 HELPING MYSELF AND OTHERS
- 3.1.10 APHORISMS
- 3.1.11 NEXT YEAR
- 3.1.12 CAREY'S GARDEN
- 3.1.13 CONCEPT AND SKILL INVENTORY

CLUSTER 2 TIME, WEATHER, AND SKY

- 3.2.1 WEATHER
- 3.2.2 TEMPERATURE
- 3.2.3 WIND
- 3.2.4 RAIN AND SNOW
- 3.2.5 HUMIDITY
- 3.2.6 SUNRISE AND SUNSET
- 3.2.7 MOON PHASES
- 3.2.8 POLAR SKY MODEL
- 3.2.9 POLAR CONSTELLATIONS
- 3.2.10 VENUS
- 3.2.11 ECLIPSES

CLUSTER 3 ANIMALS

- 3.3.1 CLASSROOM PETS
- 3.3.2 PREPARING TO RAISE INSECTS
- 3.3.3 RAISING INSECTS
- 3.3.4 IMPORTANCE OF INSECTS
- 3.3.5 NATURAL HABITATS OF FROGS AND TOADS
- 3.3.6 MAKING HABITATS FOR FROGS AND TOADS
- 3.3.7 FROG METAMORPHOSIS
- 3.3.8 IMPORTANCE OF FROGS AND TOADS
- 3.3.9 TOADS AND INSECTS
- 3.3.10 HATCHING CHICKS
- 3.3.11 CHICK GROWTH
- 3.3.12 IMPORTANCE OF BIRDS

CLUSTER 4 PLANTS

- 3.4.1 GARDEN PLANNING
- 3.4.2 GARDEN PREPARATION
- 3.4.3 WATCHING GARDEN SOIL
- 3.4.4 MAKING ARTIFICIAL SOIL

3.4.5 TESTING ARTIFICIAL SOIL

- 3.4.6 SOIL AND WATER
- 3.4.7 GARDEN PLANTING
- 3.4.8 GARDEN CARE
- 3.4.9 GARDEN WATERING SYSTEMS
- 3.4.10 GARDEN INVADERS
- 3.4.11 CONTROLLING INSECTS
- 3.4.12 GARDEN HARVESTING
- 3.4.13 FLOWERS
- 3.4.14 SEEDS
- 3.4.15 POLLINATION

CLUSTER 5 FOOD AND NUTRITION

- 3.5.1 FOOD SELECTION
- 3.5.2 SELECTING PLANTS FOR THE GARDEN
- 3.5.3 PLANNING THE CLASS FEAST
- 3.5.4 PREPARING THE CLASS FEAST
- 3.5.5 THE CLASS FEAST
- 3.5.6 DRYING FOODS
- 3.5.7 PICKLING FOODS
- 3.5.8 PRESERVING AND ROTTING
- 3.5.9 SUPERMARKET GAME PREPARATION
- 3.5.10 PRICING FOODS
- 3.5.11 NEWSPAPER ADS AND BANKING
- 3.5.12 FARMERS AND PROCESSORS
- 3.5.13 SUPERMARKET GAME

CLUSTER 6 HEALTH AND SAFETY

- 3.6.1 GROWTH CHART
- 3.6.2 TOOTH CHART
- 3.6.3 BREATHING AIR
- 3.6.4 ANATOMY OF BREATHING
- 3.6.5 LUNG MODEL
- 3.6.6 LUNGS AND SMOKING
- 3.6.7 BREATHING AND PULSE RATES
- 3.6.8 HEART, VEINS, AND ARTERIES
- 3.6.9 HEART, LUNGS, AND EXERCISE
- 3.6.10 DISEASE TRANSMISSION
- 3.6.11 TRASH AND SANITATION
- 3.6.12 HELPFUL DRUGS
- 3.6.13 PROPER DRUG USE

CLUSTER 7 WAYFINDING AND TRANSPORTATION

- 3.7.1 GARDEN MOVER
- 3.7.2 PROPELLER-DRIVEN MESSAGE CENTER
- 3.7.3 PROPELLER-DRIVEN BOAT
- 3.7.4 DELIVERY SYSTEMS

CLUSTER 8 ENERGY AND COMMUNICATION

- 3.8.1 SHADOW, LIGHT, AND BUBBLES
- 3.8.2 WIND AND HEAT
- 3.8.3 WIND PULLS AND PUSHES
- 3.8.4 PROPELLERS DRIVING PROPELLERS
- 3.8.5 WATERWHEELS
- 3.8.6 PROPELLERS IN WATER
- 3.8.7 HELIOGRAPH
- 3.8.8 SPEAKING TUBE
- 3.8.9 STRING TELEPHONE
- 3.8.10 ENERGY DEFINITIONS

CLUSTER 9 CONSERVATION, RECYCLING, AND DECOMPOSITION

- 3.9.1 MAKING COMPOST
- 3.9.2 WATCHING COMPOST
- 3.9.3 ANIMALS IN COMPOST
- 3.9.4 USING COMPOST
- 3.9.5 FALL UNEARTHING AND BURIAL
- 3.9.6 SPRING UNEARTHING AND BURIAL

CLUSTER 10 MATTER, SPACE, AND CONSTRUCTION

- 3.10.1 ACIDIC AND BASIC SOIL
- 3.10.2 ACIDS AND BASES
- 3.10.3 ACID AND BASE REACTIONS
- 3.10.4 DILUTING ACIDS AND BASES
- 3.10.5 ACID AND BASE INTERACTION
- 3.10.6 DISSOLVING THINGS
- 3.10.7 THINGS IN LIQUIDS
- 3.10.8 CRYSTALS
- 3.10.9 RAIN IN A JAR
- 3.10.10 SUPERMARKET PLANNING
- 3.10.11 SUPERMARKET CONSTRUCTION
- 3.10.12 MEASURING DEVICES
- 3.10.13 SAFETY EQUIPMENT

GRADE 4

CLUSTER 1 LEARNING

- 4.1.1 THE LEARNING CALENDAR
- 4.1.2 RESPONSIBILITY
- 4.1.3 LAST YEAR
- 4.1.4 THE LIBRARY
- 4.1.5 WORKING TOGETHER
- 4.1.6 THINGS I CAN DO FOR MYSELF AND OTHERS
- 4.1.7 APHORISMS
- 4.1.8 PLANNING
- 4.1.9 SURVIVAL GAME
- 4.1.10 CONCEPT AND SKILL INVENTORY

CLUSTER 2 TIME, WEATHER, AND SKY

- 4.2.1 RAINFALL
- 4.2.2 SNOWFALL
- 4.2.3 WIND DIRECTION
- 4.2.4 WIND SPEED
- 4.2.5 HEIGHT OF CLOUDS
- 4.2.6 HUMIDITY
- 4.2.7 CLOUDS AND WEATHER
- 4.2.8 STORM CLOUDS
- 4.2.9 LIGHTNING
- 4.2.10 WEATHER MAPS
- 4.2.11 WEATHER FRONTS
- 4.2.12 PREDICTING WEATHER
- 4.2.13 WIND CHILL
- 4.2.14 FLAT OR ROUND EARTH?
- 4.2.15 LENGTH OF DAY AND NIGHT
- 4.2.16 THE SUN'S SHADOW PATH
- 4.2.17 PLANETARIUM
- 4.2.18 USING THE PLANETARIUM
- 4.2.19 PLANETS
- 4.2.20 WHEN IS IT NOON?
- 4.2.21 MAKING A SUNDIAL
- 4.2.22 USING A SUNDIAL
- 4.2.23 SEASONS AND THE SUN
- 4.2.24 MOON PHASES AND THE SUN
- 4.2.25 ECLIPSE

CLUSTER 3 ANIMALS

- 4.3.1 PET CARE
- 4.3.2 THE UNINCUBATED EGG
- 4.3.3 CHICK EMBRYOLOGY
- 4.3.4 RAISING SMALL MAMMALS
- 4.3.5 HOUSING PET MAMMALS
- 4.3.6 WEEKEND CARE OF PET MAMMALS
- 4.3.7 PAIRING PET ANIMALS
- 4.3.8 REPRODUCTION OF PET MAMMALS
- 4.3.9 PET BABY CARE
- 4.3.10 OUR EARLY YEARS

- 4.3.11 THE FIRST GRADE CHILD
- 4.3.12 GROWTH, DEVELOPMENT, AND BEHAVIOR OF YOUNG PETS
- 4.3.13 HUMAN GROWTH AND DEVELOPMENT
- 4.3.14 CHANGING DIMENSIONS
- 4.3.15 EXTERNAL ANATOMY OF FISH
- 4.3.16 CLEANING FISH: INTERNAL ANATOMY
- 4.3.17 FISH REPRODUCTION
- 4.3.18 MODELING OUR DIGESTIVE SYSTEM
- 4.3.19 OUR DIGESTIVE SYSTEM IN TWO DIMENSIONS
- 4.3.20 DIGESTIVE, CIRCULATORY, AND RESPIRATORY SYSTEMS
- 4.3.21 LENGTH OF THE DIGESTIVE TRACT
- 4.3.22 MIGRATION AND HIBERNATION
- 4.3.23 FALL BIRDS
- 4.3.24 WINTER BIRDS
- 4.3.25 SPRING BIRDS

CLUSTER 4 PLANTS

- 4.4.1 ANNUAL, BIENNIAL, AND PERENNIAL GARDEN PLANTS
- 4.4.2 THE FUNGUS AMONG US
- 4.4.3 FUNGUS COLLECTION

CLUSTER 5 FOOD AND NUTRITION

- 4.5.1 NUTRITION MESSAGES
- 4.5.2 MECHANICAL DIGESTION
- 4.5.3 CHEMICAL DIGESTION
- 4.5.4 FOOD GROUPS
- 4.5.5 DIGESTION GAME
- 4.5.6 PRESERVING FOODS

CLUSTER 6 HEALTH AND SAFETY

- 4.6.1 GROWTH CHART AND AREA MEASUREMENT
- 4.6.2 TOOTH CHART
- 4.6.3 SAFETY GEAR
- 4.6.4 SAFETY AND PUTTING OUT FIRES
- 4.6.5 MAKING A FIRE
- 4.6.6 THINGS THAT BURN
- 4.6.7 SMOKING AND THE LUNGS
- 4.6.8 ALCOHOL, TOBACCO, AND DRUGS

CLUSTER 7 WAYFINDING AND TRANSPORTATION

- 4.7.1 BOAT DESIGN
- 4.7.2 WIND AND SAILS

CLUSTER 8 ENERGY AND COMMUNICATION

- 4.8.1 PUSH-PULL MEASURING TOOL
- 4.8.2 FRICTION
- 4.8.3 STREAMLINING
- 4.8.4 PRESSURE, SHARP EDGES, AND POINTS
- 4.8.5 ENERGY OF FALLING OBJECTS
- 4.8.6 CIRCLES AND SPEED

CLUSTER 9 CONSERVATION, RECYCLING, AND DECOMPOSITION

- 4.9.1 UNEARTHING AND BURIAL
- 4.9.2 RECYCLING PROJECT

CLUSTER 10 MATTER, SPACE, AND CONSTRUCTION

- 4.10.1 LINEAR MEASUREMENT
- 4.10.2 VOLUME MEASUREMENT
- 4.10.3 MASS MEASUREMENT
- 4.10.4 COLLECTING ROCKS
- 4.10.5 HARDNESS OF ROCKS
- 4.10.6 SPECIFIC GRAVITY
- 4.10.7 ROCKS AND SHARP EDGES
- 4.10.8 MAKING TOOLS FROM ROCK
- 4.10.9 MAKING FISHING TOOLS
- 4.10.10 CLOWNS: THINGS THAT FLOAT
- 4.10.11 CLAY
- 4.10.12 FIRE AND POTTERY
- 4.10.13 AIR AND FIRE
- 4.10.14 FIRE AND OXYGEN
- 4.10.15 PROPERTIES OF GASES

GRADE 5

CLUSTER 1 LEARNING

- 5.1.1 THE LEARNING CALENDAR
- 5.1.2 RESPONSIBILITY
- 5.1.3 LIBRARY CHECK-OUT
- 5.1.4 LIBRARY CHECK-IN
- 5.1.5 WORKING TOGETHER
- 5.1.6 THINGS I CAN DO FOR MYSELF AND OTHERS
- 5.1.7 APHORISMS
- 5.1.8 FRIENDSHIP
- 5.1.9 CONCEPT AND SKILL INVENTORY

CLUSTER 2 TIME, WEATHER, AND SKY

- 5.2.1 WEATHER STATION
- 5.2.2 HEAT INDEX
- 5.2.3 WEATHER AND ITS PREDICTION
- 5.2.4 CLOUDS AND FRONTS
- 5.2.5 TRIANGLES
- 5.2.6 GNOMON
- 5.2.7 SIZE OF EARTH
- 5.2.8 MOON THROUGH A TELESCOPE
- 5.2.9 HOW BIG AND FAR AWAY IS THE MOON?
- 5.2.10 PATHS OF CELESTIAL BODIES
- 5.2.11 MODELS OF THE SOLAR SYSTEM

CLUSTER 3 ANIMALS

- 5.3.1 PET CARE
- 5.3.2 BIRD FEEDER
- 5.3.3 BIRDS I KNOW
- 5.3.4 CELLS
- 5.3.5 CELL QUIZ
- 5.3.6 MALE UROGENITAL SYSTEM
- 5.3.7 FEMALE UROGENITAL SYSTEM
- 5.3.8 OVULATION CYCLE
- 5.3.9 OVULATION AND PREGNANCY
- 5.3.10 EMBRYOLOGY
- 5.3.11 BODY CHANGES
- 5.3.12 BONES
- 5.3.13 SKELETAL SYSTEM
- 5.3.14 MUSCLES
- 5.3.15 MUSCULAR SYSTEM
- 5.3.16 CHEMISTRY AND BONES
- 5.3.17 THE SENSES
- 5.3.18 THE EYE
- 5.3.19 SOUND
- 5.3.20 THE EAR

CLUSTER 4 PLANTS

- 5.4.1 ANNUAL, BIENNIAL, AND PERENNIAL PLANT PROJECT
- 5.4.2 TREE HARVESTING
- 5.4.3 TREE PLANTING
- 5.4.4 TREE OBSERVATION
- 5.4.5 MEASURING TREES
- 5.4.6 AGE OF TREES
- 5.4.7 TREES, SHRUBS, AND GRASSES
- 5.4.8 GRASSES: WHY DO THEY GROW THERE?
- 5.4.9 ROOTS
- 5.4.10 SOIL CONSERVATION

CLUSTER 5 FOOD AND NUTRITION

- 5.5.1 NUTRIENTS
- 5.5.2 NUTRIENTS AND CELLS
- 5.5.3 FOOD LABELING

CLUSTER 6 HEALTH AND SAFETY

- 5.6.1 GROWTH CHART AND AREA MEASUREMENT
- 5.6.2 TOOTH CHART
- 5.6.3 SAFETY DEVICES
- 5.6.4 ALCOHOL, TOBACCO, AND DRUGS
- 5.6.5 SEXUALLY TRANSMITTED DISEASES
- 5.6.6 SEXUALLY TRANSMITTED DISEASE QUIZ
- 5.6.7 TOBACCO QUIZ
- 5.6.8 SMOKERS' SURVEY
- 5.6.9 EX-SMOKERS' SURVEY
- 5.6.10 SMOKING LAWS
- 5.6.11 ALCOHOL QUIZ
- 5.6.12 ALCOHOL LAWS
- 5.6.13 CHRIS'S STORY
- 5.6.14 THE PARENTS' STORY
- 5.6.15 INTOXICATION
- 5.6.16 DRUG LAWS

CLUSTER 7 WAYFINDING AND TRANSPORTATION

- 5.7.1 WHERE IN THE WORLD ARE WE?
- 5.7.2 PLANETARIUM
- 5.7.3 MAPPING THE SKY
- 5.7.4 THE NORTH POLE, EQUATOR, AND ECLIPTIC
- 5.7.5 WHERE IS EARTH?

CLUSTER 8 ENERGY AND COMMUNICATION

- 5.8.1 PUSHES, PULLS, AND FORCES
- 5.8.2 TEETER-TOTTERS
- 5.8.3 THE BALANCE
- 5.8.4 WHEELS AND AXLES
- 5.8.5 LEVERS: WHERE ARE THEY?
- 5.8.6 ARMS AND JAWS
- 5.8.7 INCLINED PLANES AND SCREWS
- 5.8.8 BLOCK AND TACKLE
- 5.8.9 FORCES PROJECTS

CLUSTER 9 CONSERVATION, RECYCLING, AND DECOMPOSITION

- 5.9.1 CLASS RECYCLING PROJECT
- 5.9.2 CLASS CONSERVATION PROJECT
- 5.9.3 DECOMPOSITION AND ARCHEOLOGY
- 5.9.4 POLLUTION PROJECT

CLUSTER 10 MATTER, SPACE, AND CONSTRUCTION

- 5.10.1 LINEAR MEASUREMENT
- 5.10.2 VOLUME MEASUREMENT
- 5.10.3 CAMERA OBSCURA
- 5.10.4 CONTROLLING LIGHT WITH LENSES
- 5.10.5 MAKING A TELESCOPE
- 5.10.6 STABILIZING THE TELESCOPE
- 5.10.7 MAKING A MICROSCOPE
- 5.10.8 MAKING A HYGROMETER
- 5.10.9 MAKING A BAROMETER

GRADE 6

CLUSTER 1 LEARNING

- 6.1.1 THE LEARNING CALENDAR
- 6.1.2 MARS MISSION
- 6.1.3 LAST YEAR
- 6.1.4 TOMORROW
- 6.1.5 THE WORK WORLD
- 6.1.6 GOALS
- 6.1.7 CRASH SIMULATION
- 6.1.8 MARS COMPACT
- 6.1.9 MARTIAN SIMULATION
- 6.1.10 THE MISSION CONFERENCE
- 6.1.11 CONCEPT AND SKILL INVENTORY

CLUSTER 2 TIME, WEATHER, AND SKY

- 6.2.1 WEATHER STATION
- 6.2.2 WEATHER AROUND THE UNITED STATES
- 6.2.3 WEATHER AND LOCAL CLIMATE
- 6.2.4 WIND HYPOTHESES
- 6.2.5 PRODUCING WINDS
- 6.2.6 AIR PRESSURE AND ALTITUDE
- 6.2.7 WIND AND WATER
- 6.2.8 ALTITUDE AND TEMPERATURE
- 6.2.9 MODELS OF AIR
- 6.2.10 CLIMATIC REGIONS
- 6.2.11 MARS CLIMATES

CLUSTER 3 ANIMALS

- 6.3.1 ANIMAL CARE
- 6.3.2 RAISING FISH
- 6.3.3 RAISING WORMS
- 6.3.4 FOOD CHAINS

CLUSTER 4 PLANTS

- 6.4.1 HYDROPONICS
- 6.4.2 ALGAE
- 6.4.3 NUTRIENTS AND BIOLOGICAL WASTE
- 6.4.4 WATER POLLUTANTS

CLUSTER 5 FOOD AND NUTRITION

- 6.5.1 NUTRITION INFORMATION
- 6.5.2 THE KILOCALORIE
- 6.5.3 WEIGHT WATCHING
- 6.5.4 MEAL PLANNING
- 6.5.5 FOOD FOR SPACE
- 6.5.6 FISH FOR DINNER

CLUSTER 6 HEALTH AND SAFETY

- 6.6.1 GROWTH CHART
- 6.6.2 TOOTH CARE
- 6.6.3 SAFETY DEVICES
- 6.6.4 DISEASES LITERATURE
- 6.6.5 SANITATION
- 6.6.6 DISEASE PRODUCING ORGANISMS
- 6.6.7 SEXUALLY TRANSMITTED DISEASES
- 6.6.8 DRUG ABUSE PREVENTION AND TREATMENT
- 6.6.9 ALCOHOL AND TOBACCO
- 6.6.10 ENVIRONMENTAL DISEASE TRANSMISSION, PREVENTION, AND TREATMENT
- 6.6.11 EXERCISE AND HEALTH AND THE MARS MISSION

CLUSTER 7 WAYFINDING AND TRANSPORTATION

- 6.7.1 FLYING AIRPLANES
- 6.7.2 FLYING ROCKETS
- 6.7.3 SPACECRAFT
- 6.7.4 THE ORBIT OF MARS
- 6.7.5 WHAT PATH TO MARS ?

CLUSTER 8 ENERGY AND COMMUNICATION

- 6.8.1 ROCKET PROPULSION
- 6.8.2 MAGNETISM
- 6.8.3 ELECTROSTATICS
- 6.8.4 ELECTRICAL CIRCUITS
- 6.8.5 ROCK FORMATIONS
- 6.8.6 METALS FROM ORES
- 6.8.7 ASYMMETRICAL LEVERS

CLUSTER 9 CONSERVATION, RECYCLING, AND DECOMPOSITION

- 6.9.1 CLASS RECYCLING PROJECT
- 6.9.2 CONSERVATION
- 6.9.3 DECOMPOSITION: A SUMMARY
- 6.9.4 POLLUTION

CLUSTER 10 MATTER, SPACE, AND CONSTRUCTION

- 6.10.1 MAKING MEASURING EQUIPMENT
- 6.10.2 MAKING BALANCES
- 6.10.3 MAKING AN ELECTROSCOPE
- 6.10.4 MAKING ELECTROMAGNETS AND CURRENT INDICATORS
- 6.10.5 MAKING ELECTRIC CELLS
- 6.10.6 MAKING AN ELECTRIC MOTOR
- 6.10.7 MAKING AN ELECTRIC SIGNALER
- 6.10.8 MAKING A SURVIVAL HABITAT

CLUSTER ONE - LEARNING

GRADE KINDERGARTEN

- K.1.1 THE LEARNING CALENDAR
- K.1.2 THE CLASS RESPONSIBILITY CHART
- K.1.3 CALENDAR REVIEW
- K.1.4 THE HOME LEARNING CALENDAR
- K.1.5 THE SCIENCE RECORD BOOK
- K.1.6 USING OUR SENSES
- K.1.7 SAME AND DIFFERENT
- K.1.8 PHYSICAL CHARACTERISTICS OF THINGS
- K.1.9 FUNCTIONS OF THINGS
- K.1.10 THE WORKING DICTIONARY AND WORKING DEFINITIONS
- K.1.11 THE WONDER AND DISCOVER BOOK
- K.1.12 THE CONNECTIONS BOOK
- K.1.13 FAMILIES
- K.1.14 FAMILIES AND HELPING
- K.1.15 MAKING FRIENDS
- K.1.16 BEING FRIENDS
- K.1.17 SCHOOL AND HOME
- K.1.18 CONCEPT AND SKILL INVENTORY

GRADE ONE

- 1.1.1 THE LEARNING CALENDAR
- 1.1.2 THE RESPONSIBILITY CHART
- 1.1.3 THE PLANNING CALENDAR
- 1.1.4 THING LEARNED LAST YEAR
- 1.1.5 HELPING
- 1.1.6 WORKING TOGETHER
- 1.1.7 TAKING TURNS AND SHARING
- 1.1.8 CONCEPT AND SKILL INVENTORY

GRADE TWO

- 2.1.1 THE LEARNING CALENDAR
- 2.1.2 LAST YEAR
- 2.1.3 APHORISMS
- 2.1.4 HELPING MYSELF AND OTHERS
- 2.1.5 GETTING HELP
- 2.1.6 MAKING AND KEEPING FRIENDS
- 2.1.7 TURNS
- 2.1.8 SCHOOL, TEACHER, FRIENDS, AND FAMILY
- 2.1.9 PREDICTIONS ABOUT TOMORROW
- 2.1.10 PLANNING FOR TOMORROW
- 2.1.11 THINKING
- 2.1.12 LIBRARY
- 2.1.13 CONCEPT AND SKILL INVENTORY

GRADE THREE

- 3.1.1 THE LEARNING CALENDAR
- 3.1.2 LAST YEAR
- 3.1.3 RESPONSIBILITY
- 3.1.4 PLANNING
- 3.1.5 ORGANIZING OUR ENVIRONMENT
- 3.1.6 FRIENDS
- 3.1.7 GIVING AND RECEIVING
- 3.1.8 WORKING TOGETHER
- 3.1.9 HELPING MYSELF AND OTHERS
- 3.1.10 APHORISMS
- 3.1.11 NEXT YEAR
- 3.1.12 CAREY'S GARDEN
- 3.1.13 CONCEPT AND SKILL INVENTORY

GRADE FOUR

- 4.1.1 THE LEARNING CALENDAR
- 4.1.2 RESPONSIBILITY
- 4.1.3 LAST YEAR
- 4.1.4 THE LIBRARY
- 4.1.5 WORKING TOGETHER
- 4.1.6 THINGS I CAN DO FOR MYSELF AND OTHERS
- 4.1.7 APHORISMS
- 4.1.8 PLANNING
- 4.1.9 SURVIVAL GAME
- 4.1.10 CONCEPT AND SKILL INVENTORY

GRADE FIVE

- 5.1.1 THE LEARNING CALENDAR
- 5.1.2 RESPONSIBILITY
- 5.1.3 LIBRARY CHECK-OUT
- 5.1.4 LIBRARY CHECK-IN
- 5.1.5 WORKING TOGETHER
- 5.1.6 THINGS I CAN DO FOR MYSELF AND OTHERS
- 5.1.7 APHORISMS
- 5.1.8 FRIENDSHIP
- 5.1.9 CONCEPT AND SKILL INVENTORY

GRADE SIX

- 6.1.1 THE LEARNING CALENDAR
- 6.1.2 LAST YEAR
- 6.1.3 MARS MISSION
- 6.1.4 TOMORROW
- 6.1.5 THE WORK WORLD
- 6.1.6 GOALS
- 6.1.7 CRASH SIMULATION
- 6.1.8 MARS COMPACT
- 6.1.9 MARTIAN SIMULATION
- 6.1.10 THE MISSION CONFERENCE
- 6.1.11 CONCEPT AND SKILL INVENTORY

CLUSTER TWO - TIME, WEATHER, AND SKY

GRADE KINDERGARTEN

- K.2.1 WEATHER WATCH
- K.2.2 BEGINNINGS
- K.2.3 ENDINGS
- K.2.4 DAY AND NIGHT
- K.2.5 DAYS, WEEKS, AND MONTHS
- K.2.6 MOON WATCH
- K.2.7 MOON PHASES
- K.2.8 SEASONS
- K.2.9 CLOCKS AND CALENDARS

GRADE ONE

- 1.2.1 SKY AND WEATHER WATCH
- 1.2.2 RAIN AND STREAMS
- 1.2.3 SNOW AND STREAMS
- 1.2.4 THE DIGITAL CLOCK
- 1.2.5 HOURS AND MINUTES
- 1.2.6 TIME LINE
- 1.2.7 SUNRISE AND SUNSET
- 1.2.8 NIGHT AND DAY
- 1.2.9 THE SUN
- 1.2.10 THE SEASONS
- 1.2.11 MAKING A CLOCK

GRADE TWO

- 2.2.1 TEMPERATURE
- 2.2.2 WIND
- 2.2.3 SUNRISE, SUNSET, AND SEASONS
- 2.2.4 MOONRISE AND MOONSET
- 2.2.5 RAIN
- 2.2.6 SNOW
- 2.2.7 DIGITAL TIME
- 2.2.8 ANALOG TIME

GRADE THREE

- 3.2.1 WEATHER
- 3.2.2 TEMPERATURE
- 3.2.3 WIND
- 3.2.4 RAIN AND SNOW
- 3.2.5 HUMIDITY
- 3.2.6 SUNRISE AND SUNSET
- 3.2.7 MOON PHASES
- 3.2.8 POLAR SKY MODEL
- 3.2.9 POLAR CONSTELLATIONS
- 3.2.10 VENUS
- 3.2.11 ECLIPSES

GRADE FOUR

- 4.2.1 RAINFALL
- 4.2.2 SNOWFALL
- 4.2.3 WIND DIRECTION
- 4.2.4 WIND SPEED
- 4.2.5 HEIGHT OF CLOUDS
- 4.2.6 HUMIDITY
- 4.2.7 CLOUDS AND WEATHER
- 4.2.8 STORM CLOUDS
- 4.2.9 LIGHTNING

GRADE FOUR, CONTINUED

- 4.2.10 WEATHER MAPS
- 4.2.11 WEATHER FRONTS
- 4.2.12 PREDICTING WEATHER
- 4.2.13 WIND CHILL
- 4.2.14 FLAT OR ROUND EARTH?
- 4.2.15 LENGTH OF DAY AND NIGHT
- 4.2.16 THE SUN'S SHADOW PATH
- 4.2.17 PLANETARIUM
- 4.2.18 USING THE PLANETARIUM
- 4.2.19 PLANETS
- 4.2.20 WHEN IS IT NOON?
- 4.2.21 MAKING A SUNDIAL
- 4.2.22 USING A SUNDIAL
- 4.2.23 SEASONS AND THE SUN
- 4.2.24 MOON PHASES AND THE SUN
- 4.2.25 ECLIPSES

GRADE FIVE

- 5.2.1 WEATHER STATION
- 5.2.2 HEAT INDEX
- 5.2.3 WEATHER AND ITS PREDICTION
- 5.2.4 CLOUDS AND FRONTS
- 5.2.5 TRIANGLES
- 5.2.6 GNOMON
- 5.2.7 SIZE OF EARTH
- 5.2.8 MOON THROUGH A TELESCOPE
- 5.2.9 HOW BIG AND FAR AWAY IS THE MOON?
- 5.2.10 PATHS OF CELESTIAL BODIES
- 5.2.11 MODELS OF THE SOLAR SYSTEM

GRADE SIX

- 6.2.1 WEATHER STATION
- 6.2.2 WEATHER AROUND THE UNITED STATES
- 6.2.3 WEATHER AND LOCAL CLIMATE
- 6.2.4 WIND HYPOTHESES
- 6.2.5 PRODUCING WINDS
- 6.2.6 AIR PRESSURE AND ALTITUDE
- 6.2.7 WIND AND WATER
- 6.2.8 ALTITUDE AND TEMPERATURE
- 6.2.9 MODELS OF AIR
- 6.2.10 CLIMATIC REGIONS
- 6.2.11 CLIMATE OF MARS

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CLUSTER THREE - ANIMALS

GRADE KINDERGARTEN

- K.3.1 APPROPRIATE PETS
- K.3.2 CLASSROOM ANIMALS
- K.3.3 CARING FOR CLASSROOM ANIMALS
- K.3.4 LIVING, ONCE-LIVING, AND NON-LIVING
- K.3.5 ANIMALS AND PLANTS
- K.3.6 ANIMAL ENVIRONMENTS
- K.3.7 ANIMAL USES
- K.3.8 HOW BUGS WALK
- K.3.9 PARTS OF BUGS
- K.3.10 PARTS OF MAMMALS
- K.3.11 PEOPLE
- K.3.12 ANIMALS AND FOOD
- K.3.13 ANIMALS AND WATER
- K.3.14 ANIMALS AND AIR
- K.3.15 ANIMAL WASTES
- K.3.16 HOW ANIMALS KEEP WARM
- K.3.17 HOW ANIMALS KEEP COOL
- K.3.18 REAL OR IMAGINARY

GRADE ONE

- 1.3.1 LIVING AND NON-LIVING THINGS
- 1.3.2 DEFINING LIVING AND NON-LIVING THINGS
- 1.3.3 ANIMALS SURVEY
- 1.3.4 ANIMALS KEY
- 1.3.5 ANIMALS NEEDS
- 1.3.6 PLANNING TO RAISE A SMALL ANIMAL
- 1.3.7 BUILDING CAGES
- 1.3.8 METAMORPHOSIS
- 1.3.9 CLASSROOM PETS

GRADE TWO

- 2.3.1 THE CLASSROOM AQUARIUM
- 2.3.2 EXTERNAL ANATOMY OF FISH
- 2.3.3 BIOLOGICAL NEEDS OF FISH
- 2.3.4 REPRODUCTION AND DEVELOPMENT OF FISH
- 2.3.5 FINDING INSECT EGGS
- 2.3.6 HATCHING INSECT EGGS
- 2.3.7 EARLY METAMORPHOSIS
- 2.3.8 LATE METAMORPHOSIS
- 2.3.9 COLLECTING SPIDERS
- 2.3.10 SPIDER FOOD
- 2.3.11 SPIDER CARE
- 2.3.12 SPIDERS AS PREDATORS
- 2.3.13 SPIDER WEBS
- 2.3.14 CLASSROOM PETS

GRADE THREE

- 3.3.1 CLASSROOM PETS INSECTS
- 3.3.2 PREPARING TO RAISE INSECTS
- 3.3.3 RAISING INSECTS
- 3.3.4 IMPORTANCE OF INSECTS
- 3.3.5 NATURAL HABITATS OF FROGS AND TOADS
- 3.3.6 MAKING HABITATS FOR FROGS AND TOADS
- 3.3.7 FROG METAMORPHOSIS
- 3.3.8 IMPORTANCE OF FROGS AND TOADS
- 3.3.9 TOADS AND INSECTS
- 3.3.10 HATCHING CHICKS
- 3.3.11 CHICK GROWTH
- 3.3.12 IMPORTANCE OF BIRDS

GRADE FOUR

- 4.3.1 PET CARE
- 4.3.2 THE UNINCUBATED EGG
- 4.3.3 CHICK EMBRYOLOGY
- 4.3.4 RAISING SMALL MAMMALS
- 4.3.5 HOUSING PET MAMMALS
- 4.3.6 WEEKEND CARE OF PET MAMMALS
- 4.3.7 PAIRING PET MAMMALS
- 4.3.8 REPRODUCTION OF PET MAMMALS
- 4.3.9 PET BABY CARE
- 4.3.10 OUR EARLY YEARS
- 4.3.11 THE FIRST GRADE CHILD
- 4.3.12 GROWTH, DEVELOPMENT, AND BEHAVIOR OF YOUNG PETS
- 4.3.13 HUMAN GROWTH AND DEVELOPMENT
- 4.3.14 CHANGING DIMENSIONS
- 4.3.15 EXTERNAL ANATOMY OF FISH
- 4.3.16 CLEANING FISH: INTERNAL ANATOMY
- 4.3.17 FISH REPRODUCTION
- 4.3.18 MODELING OUR DIGESTIVE SYSTEM
- 4.3.19 OUR DIGESTIVE SYSTEM IN TWO DIMENSIONS
- 4.3.20 DIGESTIVE, CIRCULATORY, AND RESPIRATORY SYSTEMS
- 4.3.21 LENGTH OF THE DIGESTIVE TRACT
- 4.3.22 MIGRATION AND HIBERNATION
- 4.3.23 FALL BIRDS
- 4.3.24 WINTER BIRDS
- 4.3.25 SPRING BIRDS

GRADE FIVE

- 5.3.1 PET CARE
- 5.3.2 BIRD FEEDER
- 5.3.3 BIRDS I KNOW
- 5.3.4 CELLS
- 5.3.5 CELL QUIZ
- 5.3.6 MALE UROGENITAL SYSTEM
- 5.3.7 FEMALE UROGENITAL SYSTEM
- 5.3.8 OVULATION CYCLE
- 5.3.9 OVULATION AND PREGNANCY
- 5.3.10 EMBRYOLOGY
- 5.3.11 BODY CHANGES
- 5.3.12 BONES
- 5.3.13 SKELETAL SYSTEM
- 5.3.14 MUSCLES
- 5.3.15 MUSCULAR SYSTEM
- 5.3.16 CHEMISTRY AND BONES
- 5.3.17 THE SENSES
- 5.3.18 THE EYE
- 5.3.19 SOUND
- 5.3.20 THE EAR

GRADE SIX

- 6.3.1 ANIMAL CARE
- 6.3.2 RAISING FISH
- 6.3.3 RAISING WORMS
- 6.3.4 FOOD CHAINS

CLUSTER FOUR - PLANTS

GRADE KINDERGARTEN

- K.4.1 PLANT PARTS
- K.4.2 PLANT ENVIRONMENTS
- K.4.3 PLANT USES
- K.4.4 GROWING BEAN SPROUTS
- K.4.5 PLANTS AND WATER
- K.4.6 GARDENING

GRADE ONE

- 1.4.1 PLANT IDENTIFICATION
- 1.4.2 PLANT SURVEY
- 1.4.3 PLANT PRESSING
- 1.4.4 PLANT KEY
- 1.4.5 PLANT NEEDS
- 1.4.6 PLANT LIFE CYCLE
- 1.4.7 EDIBLE PLANT PARTS
- 1.4.8 PLANT PARTS ANIMALS EAT

GRADE TWO

- 2.4.1 SOIL
- 2.4.2 MAKING SOIL
- 2.4.3 SOIL AND PLANTS
- 2.4.4 SOIL USES
- 2.4.5 FINDING SOIL
- 2.4.6 PIPES AND WATER
- 2.4.7 MOVING WATER WITH GRAVITY
- 2.4.8 MOVING WATER WITH PUMPS
- 2.4.9 VEGETABLE GARDEN IN A BUCKET
- 2.4.10 FLOWER GARDEN IN A BUCKET
- 2.4.11 PLANTS AND SUNLIGHT
- 2.4.12 ROOTING STEMS
- 2.4.13 ROOTING BULBS AND TUBERS
- 2.4.14 ROOTS AND WATER
- 2.4.15 GROWING ROOT VEGETABLES
- 2.4.16 TREE PLANTING

GRADE THREE

- 3.4.1 GARDEN PLANNING
- 3.4.2 GARDEN PREPARATION
- 3.4.3 WATCHING GARDEN SOIL
- 3.4.4 MAKING ARTIFICIAL SOIL
- 3.4.5 TESTING ARTIFICIAL SOIL
- 3.4.6 SOIL AND WATER
- 3.4.7 GARDEN PLANTING
- 3.4.8 GARDEN CARE
- 3.4.9 GARDEN WATERING SYSTEMS

GRADE THREE - CONTINUED

- 3.4.10 GARDEN INVADERS
- 3.4.11 CONTROLLING INSECTS
- 3.4.12 GARDEN HARVESTING
- 3.4.13 FLOWERS
- 3.4.14 SEEDS
- 3.4.15 POLLINATION

GRADE FOUR

- 4.4.1 ANNUAL, BIENNIAL, AND PERENNIAL GARDEN PLANTS
- 4.4.2 THE FUNGUS AMONG US
- 4.4.3 FUNGUS COLLECTION

GRADE FIVE

- 5.4.1 ANNUAL, BIENNIAL, AND PERENNIAL PLANT PROJECT
- 5.4.2 TREE HARVESTING
- 5.4.3 TREE PLANTING
- 5.4.4 TREE OBSERVATION
- 5.4.5 MEASURING TREES
- 5.4.6 AGE OF TREES
- 5.4.7 TREES, SHRUBS, AND GRASSES
- 5.4.8 GRASSES: WHY DO THEY GROW THERE?
- 5.4.9 ROOTS
- 5.4.10 SOIL CONSERVATION

GRADE SIX

- 6.4.1 HYDROPONICS
- 6.4.2 ALGAE
- 6.4.3 NUTRIENTS AND BIOLOGICAL WASTE
- 6.4.4 WATER POLLUTANTS

CLUSTER FIVE - FOOD AND NUTRITION

GRADE KINDERGARTEN

- K.5.1 BEAN SPROUT SALAD
- K.5.2 DRINKS
- K.5.3 FLOUR AND BREAD
- K.5.4 FAMILIAR FOODS
- K.5.5 FAVORITE FOODS
- K.5.6 NEW FOODS

GRADE ONE

- 1.5.1 BASIC THREE FOOD GROUPS
- 1.5.2 COOKING
- 1.5.3 MEASURING VOLUME

GRADE TWO

- 2.5.1 SUPERMARKET SURVEY
- 2.5.2 FOOD PREFERENCES
- 2.5.3 BASIC THREE FOOD GROUPS
- 2.5.4 NEW FOODS
- 2.5.5 IDENTIFYING PROPERTIES OF VEGETABLES
- 2.5.6 CHANGING FLAVOR
- 2.5.7 MILK
- 2.5.8 BUTTER
- 2.5.9 CHEESE
- 2.5.10 ENERGY FROM FOOD

GRADE THREE

- 3.5.1 FOOD SELECTION
- 3.5.2 SELECTING PLANTS FOR THE GARDEN
- 3.5.3 PLANNING THE CLASS FEAST
- 3.5.4 PREPARING THE CLASS FEAST
- 3.5.5 THE CLASS FEAST
- 3.5.6 DRYING FOODS
- 3.5.7 PICKLING FOODS
- 3.5.8 PRESERVING AND ROTTING
- 3.5.9 SUPERMARKET GAME PREPARATION
- 3.5.10 PRICING FOODS
- 3.5.11 NEWSPAPER ADS AND BANKING
- 3.5.12 FARMERS AND PROCESSORS
- 3.5.13 SUPERMARKET GAME

GRADE FOUR

- 4.5.1 NUTRITION MESSAGES
- 4.5.2 MECHANICAL DIGESTION
- 4.5.3 CHEMICAL DIGESTION
- 4.5.4 FOOD GROUPS
- 4.5.5 DIGESTION GAME
- 4.5.6 PRESERVING FOODS

GRADE FIVE

- 5.5.1 NUTRIENTS
- 5.5.2 NUTRIENTS AND CELLS
- 5.5.3 THE KILOCALORIE
- 5.5.4 RDAS AND FOOD LABELING

GRADE SIX

- 6.5.1 NUTRIENT TABLES
- 6.5.2 THE KILOCALORIE
- 6.5.3 WEIGHT WATCHING
- 6.5.4 MEAL PLANNING
- 6.5.5 FOOD FOR SPACE
- 6.5.6 FISH AND ALGAE FOR DINNER

CLUSTER SIX - HEALTH AND SAFETY

GRADE KINDERGARTEN

- K.6.1 GROWTH CHART
- K.6.2 TOOTH CHART
- K.6.3 TOOTH CARE
- K.6.4 EXERCISE
- K.6.5 GERMS
- K.6.6 WASHING HANDS
- K.6.7 BATHROOMS AND BASINS
- K.6.8 APRONS
- K.6.9 FOUNTAINS AND FAUCETS
- K.6.10 GETTING SICK
- K.6.11 FEELING SICK
- K.6.12 GOING TO THE DOCTOR
- K.6.13 WHAT DOCTORS DO
- K.6.14 GOING TO THE HOSPITAL
- K.6.15 RAINCOATS
- K.6.16 TESTING RAINCOATS
- K.6.17 WET AND COLD
- K.6.18 KEEPING WARM INDOORS
- K.6.19 KEEPING COOL INDOORS
- K.6.20 HAND AND FOOT PROTECTION
- K.6.21 GETTING LOST

GRADE ONE

- 1.6.1 GROWTH CHART
- 1.6.2 TOOTH CHART
- 1.6.3 BRUSHING TEETH
- 1.6.4 CHEWING
- 1.6.5 AIR AND BREATHING
- 1.6.6 GETTING HURT
- 1.6.7 STAYING HEALTHY
- 1.6.8 SAFETY RULES

GRADE TWO

- 2.6.1 GROWTH CHART
- 2.6.2 TOOTH CHART
- 2.6.3 TOOTH CARE
- 2.6.4 GETTING HURT
- 2.6.5 GETTING SICK
- 2.6.6 STAYING WELL
- 2.6.7 CLASSROOM AND PLAYGROUND SAFETY
- 2.6.8 FIRE SAFETY
- 2.6.9 USING 911

GRADE THREE

- 3.6.1 GROWTH CHART
- 3.6.2 TOOTH CHART
- 3.6.3 BREATHING AIR
- 3.6.4 ANATOMY OF BREATHING
- 3.6.5 LUNG MODEL
- 3.6.6 LUNGS AND SMOKING
- 3.6.7 BREATHING AND PULSE RATES
- 3.6.8 HEART, VEINS, AND ARTERIES
- 3.6.9 HEART, LUNGS, AND EXERCISE
- 3.6.10 DISEASE TRANSMISSION
- 3.6.11 TRASH AND SANITATION
- 3.6.12 HELPFUL DRUGS
- 3.6.13 PROPER DRUG USE

GRADE FOUR

- 4.6.1 GROWTH CHART AND AREA MEASUREMENT
- 4.6.2 TOOTH CHART
- 4.6.3 SAFETY GEAR
- 4.6.4 SAFETY AND PUTTING OUT FIRES
- 4.6.5 MAKING A FIRE
- 4.6.6 THINGS THAT BURN
- 4.6.7 SMOKING AND THE LUNGS
- 4.6.8 ALCOHOL, TOBACCO, AND DRUGS

GRADE FIVE

- 5.6.1 GROWTH CHART AND AREA MEASUREMENT
- 5.6.2 TOOTH CHART
- 5.6.3 SAFETY DEVICES
- 5.6.4 ALCOHOL, TOBACCO, AND DRUGS
- 5.6.5 SEXUALLY TRANSMITTED DISEASES
- 5.6.6 SEXUALLY TRANSMITTED DISEASE QUIZ
- 5.6.7 TOBACCO QUIZ
- 5.6.8 SMOKERS' SURVEY
- 5.6.9 EX-SMOKERS' SURVEY
- 5.6.10 SMOKING LAWS
- 5.6.11 ALCOHOL QUIZ
- 5.6.12 ALCOHOL LAWS
- 5.6.13 CHRIS'S STORY
- 5.6.14 THE PARENTS' STORY
- 5.6.15 INTOXICATION
- 5.6.16 DRUG LAWS

GRADE SIX

- 6.6.1 GROWTH CHART
- 6.6.2 TOOTH CHART
- 6.6.3 SAFETY DEVICES
- 6.6.4 DISEASE LITERATURE
- 6.6.5 SANITATION
- 6.6.6 DISEASE PREVENTION AND TREATMENT
- 6.6.7 SEXUALLY TRANSMITTED DISEASES
- 6.6.8 DRUG ABUSE PREVENTION AND TREATMENT
- 6.6.9 ALCOHOL AND TOBACCO ADDICTION, PREVENTION, AND TREATMENT
- 6.6.10 ENVIRONMENTAL DISEASE TRANSMISSION, PREVENTION, AND TREATMENT
- 6.6.11 EXERCISE AND HEALTH AND THE MARS MISSION

CLUSTER SEVEN - WAYFINDING AND TRANSPORTATION

KINDERGARTEN

- K.7.1 RIGHT AND LEFT
- K.7.2 SUNRISE
- K.7.3 SUNSET
- K.7.4 NORTH AND SOUTH
- K.7.5 RISING MOON
- K.7.6 SETTING MOON
- K.7.7 HOME LOCATION
- K.7.8 SIDEWALKS AND WALKWAYS
- K.7.9 ROADS
- K.7.10 TRAFFIC SIMULATION
- K.7.11 TRAFFIC RULES
- K.7.12 MAPPING

GRADE 1

- 1.7.1 PACING
- 1.7.2 NORTH, SOUTH, EAST, AND WEST
- 1.7.3 HOME
- 1.7.4 MAP DISTANCE
- 1.7.5 MAKING A BOAT
- 1.7.6 MAKING A LAKE
- 1.7.7 THE GREAT REGATTA
- 1.7.8 FLOATING AND SINKING
- 1.7.9 DRAINING A LAKE

GRADE 2

- 2.7.1 TRANSPORTATION SYSTEMS
- 2.7.2 MAKING RACE CARS
- 2.7.3 RACING AND MODIFYING CARS
- 2.7.4 ROADS
- 2.7.5 BUILDING A VILLAGE
- 2.7.6 PEDESTRIANS IN THE VILLAGE
- 2.7.7 BIKES IN THE VILLAGE
- 2.7.8 CARS IN THE VILLAGE
- 2.7.9 BIKES AND TRIKES
- 2.7.10 BELTS AND PULLEYS
- 2.7.11 FAST AND SLOW PULLEYS
- 2.7.12 GEARS AND WHEELS

GRADE 3

- 3.7.1 GARDEN MOVER
- 3.7.2 PROPELLER-DRIVEN MESSAGE CENTER
- 3.7.3 PROPELLER-DRIVEN BOAT
- 3.7.4 DELIVERY SYSTEMS

GRADE 4

- 4.7.1 BOAT DESIGN
- 4.7.2 WIND AND SAILS

GRADE 5

- 5.7.1 WHERE IN THE WORLD ARE WE?
- 5.7.2 PLANETARIUM
- 5.7.3 MAPPING THE SKY
- 5.7.4 THE NORTH POLE, EQUATOR, AND ECLIPTIC
- 5.7.5 WHERE IS EARTH?

GRADE 6

- 6.7.1 FLYING AIRPLANES
- 6.7.2 FLYING ROCKETS
- 6.7.3 SPACECRAFT
- 6.7.4 THE ORBIT OF MARS
- 6.7.5 WHAT PATH TO MARS?

CLUSTER EIGHT - ENERGY AND COMMUNICATION

GRADE KINDERGARTEN

- K.8.1 ENERGY
- K.8.2 MAKING THINGS MOVE
- K.8.3 MAKING THINGS STOP
- K.8.4 TURNING THINGS OFF
- K.8.5 TURNING THINGS ON
- K.8.6 REPAIRING THINGS

GRADE ONE

- 1.8.1 TEMPERATURE OF THINGS
- 1.8.2 THE MASTER THERMOMETER
- 1.8.3 HOT AND COLD
- 1.8.4 SOURCES OF ENERGY

GRADE TWO

- 2.8.1 CAMERA OBSCURA
- 2.8.2 MIRRORS AND SUNLIGHT
- 2.8.3 CLOUDS AND SUNLIGHT
- 2.8.4 COMPARING TEMPERATURES
- 2.8.5 ECLIPSES

GRADE THREE

- 3.8.1 SHADOW, LIGHT, AND BUBBLES
- 3.8.2 WIND AND HEAT
- 3.8.3 WIND PULLS AND PUSHES
- 3.8.4 PROPELLERS DRIVING PROPELLERS
- 3.8.5 WATERWHEELS
- 3.8.6 PROPELLERS IN WATER
- 3.8.7 HELIOGRAPH
- 3.8.8 SPEAKING TUBE
- 3.8.9 STRING TELEPHONE
- 3.8.10 ENERGY DEFINITIONS

GRADE FOUR

- 4.8.1 PUSH-PULL MEASURING TOOL
- 4.8.2 FRICTION
- 4.8.3 STREAMLINING
- 4.8.4 PRESSURE, SHARP EDGES, AND POINTS
- 4.8.5 ENERGY OF FALLING OBJECTS
- 4.8.6 CIRCLES AND SPEED

GRADE FIVE

- 5.8.1 PUSHES, PULLS, AND FORCES
- 5.8.2 TEETER-TOTTERS
- 5.8.3 THE BALANCE
- 5.8.4 WHEELS AND AXLES
- 5.8.5 LEVERS: WHERE ARE THEY?
- 5.8.6 ARMS AND JAWS
- 5.8.7 INCLINED PLANES AND SCREWS
- 5.8.8 BLOCK AND TACKLE
- 5.8.9 MAGNETIC PUSHES AND PULLS
- 5.8.10 MAGNETS AND COMPASSES
- 5.8.11 MAGNETIC FIELDS
- 5.8.12 FORCES PROJECTS

GRADE SIX

- 6.8.1 ROCKET PROPULSION
- 6.8.2 MAGNETISM
- 6.8.3 ELECTROSTATICS
- 6.8.4 ELECTRICAL CIRCUITS
- 6.8.5 ROCK FORMATION
- 6.8.6 METALS FROM ORES
- 6.8.7 ASSYMETRICAL LEVERS

CLUSTER NINE - CONSERVATION, RECYCLING
AND DECOMPOSITION

GRADE KINDERGARTEN

- K.9.1 DECOMPOSITION
- K.9.2 WASTE DISPOSAL
- K.9.3 RECYCLING PROJECT
- K.9.4 MAKING PAPER

GRADE ONE

- 1.9.1 CONSERVING CLASSROOM
RESOURCES
- 1.9.2 CONSERVING ENERGY
- 1.9.3 CONSERVING WATER
- 1.9.4 DECOMPOSITION AND
UNEARTHING
- 1.9.5 DECOMPOSITION AND
REBURIAL
- 1.9.6 RECYCLING

GRADE TWO

- 2.9.1 FALL UNEARTHING
- 2.9.2 FALL BURYING
- 2.9.3 SPRING UNEARTHING
- 2.9.4 SPRING BURYING
- 2.9.5 POLLUTION SURVEY AND
CLEANUP
- 2.9.6 ALUMINUM RECYCLING
- 2.9.7 CONNECTIONS

GRADE THREE

- 3.9.1 MAKING COMPOST
- 3.9.2 WATCHING COMPOST
- 3.9.3 ANIMALS IN COMPOST
- 3.9.4 USING COMPOST
- 3.9.5 FALL UNEARTHING AND
BURIAL
- 3.9.6 SPRING UNEARTHING AND
BURIAL

GRADE FOUR

- 4.9.1 UNEARTHING AND BURIAL
- 4.9.2 RECYCLING PROJECT

GRADE FIVE

- 5.9.1 CLASS RECYCLING PROJECT
- 5.9.2 CLASS CONSERVATION
PROJECT
- 5.9.3 DECOMPOSITION AND
ARCHEOLOGY
- 5.9.4 POLLUTION PROJECT

GRADE SIX

- 6.9.1 RECYCLING PROJECT
- 6.9.2 CONSERVATION
- 6.9.3 DECOMPOSITION: A
SUMMARY
- 6.9.4 POLLUTION

CLUSTER TEN - MATTER SPACE, AND CONSTRUCTION

GRADE KINDERGARTEN

- K.10.1 CUBBY ORGANIZATION
- K.10.2 PATTERNS IN PUZZLES
- K.10.3 MAKING ENVELOPES
- K.10.4 MAKING PUZZLES
- K.10.5 MAKING BOXES AND BAGS
- K.10.6 VOLUME OF BOXES AND BAGS
- K.10.7 PACKING AND STORING
- K.10.8 LINEAR MEASUREMENT

GRADE ONE

- 1.10.1 METER-STRING CAN
- 1.10.2 OUTDOOR STUDY AREA MAPPING
- 1.10.3 TESTING FOR WATER
- 1.10.4 PLUMBING
- 1.10.5 WATER SYSTEMS
- 1.10.6 AIR
- 1.10.7 BUBBLES IN WATER
- 1.10.8 BUBBLES IN AIR
- 1.10.9 BUILDING WITH AIR
- 1.10.10 FLOOR PLAN
- 1.10.11 FLOOR PLAN MODEL
- 1.10.12 CARDBOARD HOUSE PLAN
- 1.10.13 MAKING A CARDBOARD HOUSE
- 1.10.14 PAINTING THE HOUSE
- 1.10.15 FURNISHING THE HOUSE
- 1.10.16 SEWING
- 1.10.17 WEAVING
- 1.10.18 WARMING AND COOLING THE HOUSE
- 1.10.19 LIGHTING THE HOUSE

GRADE TWO

- 2.10.1 DESK ORGANIZATION
- 2.10.2 NOTEBOOK ORGANIZATION
- 2.10.3 THE BALANCE
- 2.10.4 METER-STRING CAN
- 2.10.5 MEASURING VOLUME

GRADE THREE

- 3.10.1 ACIDIC AND BASIC SOIL
- 3.10.2 ACIDS AND BASES
- 3.10.3 ACID AND BASE REACTIONS
- 3.10.4 DILUTING ACIDS AND BASES
- 3.10.5 ACID AND BASE INTERACTION
- 3.10.6 DISSOLVING THINGS
- 3.10.7 THINGS IN LIQUIDS
- 3.10.8 CRYSTALS
- 3.10.9 RAIN IN A JAR

GRADE THREE - Continued

- 3.10.10 SUPERMARKET PLANNING
- 3.10.11 SUPERMARKET CONSTRUCTION
- 3.10.12 MEASURING DEVICES
- 3.10.13 SAFETY EQUIPMENT

GRADE FOUR

- 4.10.1 LINEAR MEASUREMENT
- 4.10.2 VOLUME MEASUREMENT
- 4.10.3 MASS MEASUREMENT
- 4.10.4 COLLECTING ROCKS
- 4.10.5 HARDNESS OF ROCKS
- 4.10.6 SPECIFIC GRAVITY
- 4.10.7 ROCKS AND SHARP EDGES
- 4.10.8 MAKING TOOLS FROM ROCK
- 4.10.9 MAKING FISHING TOOLS
- 4.10.10 CLOWNS: THINGS THAT FLOAT
- 4.10.11 CLAY
- 4.10.12 FIRE AND POTTERY
- 4.10.13 AIR AND FIRE
- 4.10.14 FIRE AND OXYGEN
- 4.10.15 PROPERTIES OF GASES

GRADE FIVE

- 5.10.1 LINEAR MEASUREMENT
- 5.10.2 VOLUME MEASUREMENT
- 5.10.3 CAMERA OBSCURA
- 5.10.4 CONTROLLING LIGHT WITH LENSES
- 5.10.5 MAKING A TELESCOPE
- 5.10.6 STABILIZING THE TELESCOPE
- 5.10.7 MAKING A MICROSCOPE
- 5.10.8 MAKING A HYGROMETER
- 5.10.9 MAKING A BAROMETER

GRADE SIX

- 6.10.1 MAKING MEASURING EQUIPMENT
- 6.10.2 MAKING A BALANCE
- 6.10.3 MAKING AN ELECTROSCOPE
- 6.10.4 MAKING ELECTROMAGNETS AND CURRENT INDICATORS
- 6.10.5 ELECTRIC CELLS
- 6.10.6 MAKING AN ELECTRIC MOTOR
- 6.10.7 MAKING AN ELECTRIC SIGNALER
- 6.10.8 MAKING A SURVIVAL HABITAT



GRADE K

MATERIALS LIST

DASH Kindergarten Equipment and Supplies

Classroom Supplies	Consumable Supplies (Discount Dept. or Grocery Store)
Consumable Brass fasteners, 1/2", 100 Chart paper, plain and 1" grid Colored chalk, small, 1 box Construction paper, asstd. Crayons Glue, white and Post-it Index cards, asstd. Markers, asstd. colors, washable Markers, waterproof, asstd. Modeling clay or play dough Oak tag, chart size Pencils Paint, tempa, asstd. w/ brushes or sponges Pushpins Sidewalk chalk, 1-2 boxes Staples String Tapes, masking, cellophane Permanent Meterstick or tape Paper punch, 2-4, single hole Scissors, heavy duty (universal or bandage) Scissors, student Stapler	Cocoa, unsweetened, 1/4 cup Cooking oil, 8 oz. Dish towel, 2, flour sackling Drink mixes Dowel or stick, 1/4" diam., 24" long Facial tissues, 1 box Foil, aluminum, 1 roll Food coloring Forks, plastic (50-60) Gelatin, unflavored, 1 envelope Gloves, plastic Ingredients for corn bread Paper plates, 6-8" diam, 2/student Paper plates, 8-12" diam., 100 ct. Paper towels, 2-4 rolls Pet food, litter Plastic bags, heavy freezer, resealable, qt., 25 Plastic bags, sandwich size, resealable, 100 Plastic bags, resealable, asstd. sizes Plastic bags, large (trash), 2-3/student, (colors opt) Plastic cups, clear, soft, 9-10 oz., 25-50 Plastic or paper cups, 3 oz., 1-2/student Plastic wrap, 1 roll Popcorn, unpopped, 1 small pkg. Tape, duct, 4-6 rolls Tapes, asstd. colored plastic (opt.) Yarn, asst. colors
Permanent Supplies*	Recycled Materials
Ball Blender Bowl, serving size Cooking equipment, asstd. Dishpans, buckets or large bowls, 4-6 Fan, small battery-powered, (opt.) Garden tools, asstd. Garden hose Hand lenses, 1/2 students Legos, 8-10 pieces/student Magnetic compass (opt.) Maps, asstd. types Map of school district Pitchers, 2-4 1-2 qt. Puppets, animal or others (opt.) Puzzles, framed and unframed Scale, bathroom Stethoscope (opt.) Teeth model (optional) *Many of these items can be borrowed or shared within a school.	Aluminum pie pans and asstd. containers Arts & crafts supplies misc., asstd. Bags, paper, asstd. sizes Boxes, corrugated cardboard Cardboard milk or juice cartons, asstd. sizes Fabric scraps Magazines with colored pictures Newspapers Nylon stockings Plastic containers, asstd. Screening, fiberglass Soap, hotel size, 4-8 Styrofoam, small chips Styrofoam, asstd. pieces and containers Tubes, cardboard, asstd.
Special Purchase	Other
Calendar paper-24" roll or computer Mung bean seeds, 1 pkg. Pet, pet cage, misc. supplies Thermometer, large, w/ °C & °F (permanent)	Classification collections: rulers, pencils, clips Foods (usually requested from students)



GRADE K

**COMPLEMENTARY
MATERIALS**

**DASH
ON
HOME**

K



University of Hawai'i • College of Education
Curriculum Research & Development Group

Science Projects

1776 University Avenue • Honolulu, Hawai'i 96822

Telephone: (808) 956-6918 • (800) 799-8111

Fax: (808) 956-4933 • (808) 956-4114

May 9, 1996

Dear *DASH* Teacher:

DASH holds to the notion that the study of science and technology should not be limited to the four walls of the classroom. Scientific and technological ways of knowing and doing are applicable in any part of the student's 24-hour day, and the aid of parents and others can help extend the experience of the student. The *DASH on HOME* newsletters are provided as a supplement to the *DASH* materials. Use them if they fit your needs.

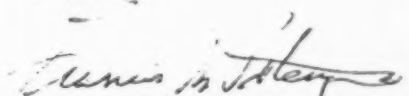
Dr. Ann Baldwin Taylor of Carnegie Mellon University has headed a project to produce a series of *DASH on Home* newsletters for parents. Copies of these along with a letter of explanation follow. The newsletters are designed to provide your parents with extensional *DASH*-like activities that can be done in the home as parent-child inquiries. Though formatted formally, they can be cut up and reassembled in any way that meets your needs. Enclosed in this packet you will find

1. Copies of the *DASH on Home* family newsletters for you to copy and send to families as needed.
2. A "Dear Family" letter which you may want to use to introduce the newsletters to families. (Copy or write your own letter.)

Hints for successful use of *DASH on Home*

1. To let families know what to expect from the newsletters, we have enclosed a "Dear Family" letter that can be sent home with the first newsletter.
2. Talk with your students before sending any newsletters home. You may want to discuss the topics and ask the children to let you know about the activities that are completed at home. You may want to ask your children to bring reports and projects back to share with the group.
3. Familiarize yourself with each newsletter so that you can have discussions and answer questions from parents and children as they are doing activities at home.
4. You will have two newsletters for your grade. We recommend sending one home in the Fall and one in the Spring.
5. Some teachers have found that including personalized information on an additional newsletter page has been very successful. By adding names, pictures, local maps, or school logos, *DASH on Home* becomes your own. The "sample personalized newsletter page" in this folder may give you ideas.

Sincerely,


Francis M. Pottenger III, Director

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DASH

DEVELOPMENTAL APPROACHES IN SCIENCE

ON HOME

AND HEALTH

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ACTIVITIES FOR FAMILIES

VOLUME K, NUMBER 1

IN SCHOOL THIS YEAR OUR CHILDREN ARE BEING ENCOURAGED TO OBSERVE THE WORLD AROUND THEM. WEATHER IS A FASCINATING AND PRACTICAL TOPIC FOR DAILY OBSERVATION. WE CAN SEE IT, FEEL IT, SOMETIMES HEAR IT, SMELL IT AND EVEN TASTE IT. REMIND YOUR CHILD THAT THE MORE WE KNOW ABOUT WEATHER THE BETTER WE CAN PROVIDE FOR OUR HEALTH AND SAFETY AND APPRECIATE THE WONDERS OF NATURE.



This newsletter has been designed for the *Developmental Approaches in Science and Health (DASH)* curriculum that is being used in your child's school. DASH is a new curriculum for kindergarten through sixth grade. DASH integrates science, health and technology subjects into all aspects of the school program.

You could "bring DASH on home" by including science activities in your daily life. This newsletter will give you some ideas. Save the newsletters and take your time with them.

DASH has several units or "clusters." The activities in this newsletter complement several DASH clusters. Look for **bold letters** to indicate the DASH ideas.

If you have any questions or comments about *DASH on Home*, please contact: DASH c/o The Children's School, Carnegie Mellon University, MMCC 17, Pittsburgh, PA 15213.

WEATHER WATCHING

Observe weather together as a family. Ask your child what the weather looks like in the morning.

Will the day be sunny, rainy or snowy, warm or cold? Talk together about clues to changes in the weather whenever you see them—clouds forming or breaking up, sun coming out, wind getting stronger, and so on.

See how many senses you can use to observe the weather. Look at the sky. Feel the wind and the temperature when you go outside. Smell the difference between a dry day and a wet day. Taste the rain or snow. Listen to wind, rain, thunder. (**Time, Weather and Sky**)

SIGNS OF FALL

How do we know when fall starts, when it is truly here, and when it ends? Talk about fall and what it means.

Look for signs of fall in food markets, in the woods, in gardens, in seasonal decorations. Ask your child questions about what is happening to flowers, to leaves, to trees, to day and night temperatures, and to birds and other animals.

If you live where it snows, have each family member predict when the first snow will fall. Mark the predictions on a calendar and see whose prediction comes closest to the actual date. (**Time, Weather and Sky**)

Suggestion: Find out what your child observes before sharing what you see. Children learn more by forming their own opinions first, even if some ideas have to be corrected.



FALL MEMORIES

Talk with your child about memories of other falls. Has the family always lived in the same place? Where have older family members lived? Share what you remember about fall when you were growing up. Encourage your child to ask older family members or friends about their memories of fall, memories of raking and jumping in leaves, of watching football games, of going hunting, of carving jack-o'-lanterns, of picking apples, of canning food.

Ask your children what they can remember of past fall seasons, Halloweens and Thanksgivings. Use stories and photographs to help them to remember. (Learning)



DRESSING FOR FALL

How does weather affect what we wear? Talk with your child about what would be appropriate to wear and what would be a problem. For example, why wouldn't we wear bathing suits when it's cold?

How are fall and winter clothes different from summer clothes? Are the sleeves longer? Are we wearing long pants instead of shorts? Are the materials different? Are the colors different? Do we have different shoes? Different pajamas or nightgowns? Do we have different coats? What other outdoor clothing do we wear (raincoat, umbrella, boots, scarf, hat, mittens, etc.)? (Health and Safety)





DASH

DEVELOPMENTAL APPROACHES IN SCIENCE

ON HOME

AND HEALTH

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ACTIVITIES FOR FAMILIES

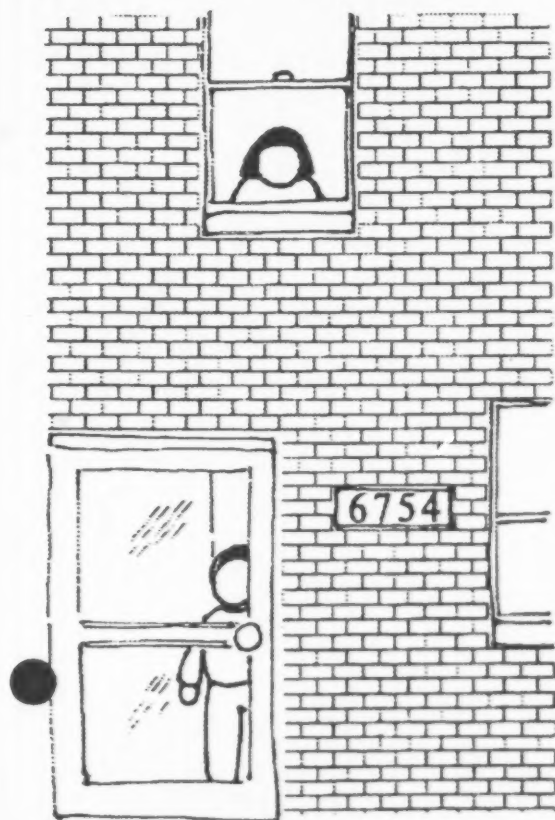
VOLUME K, NUMBER 2

KINDERGARTEN CHILDREN ARE LEARNING MANY THINGS ABOUT THEMSELVES AND OTHERS. WE HAVE SHOWN WHERE PEOPLE LIVE AND HAVE TALKED ABOUT WHO IS IN EACH CHILD'S FAMILY. YOU CAN CONTINUE SOME OF THESE SAME OBSERVATIONS AT HOME.



EXPLORING YOUR ADDRESS

By now your child probably knows your address. Go over the various parts of the address and have your child observe how your address helps someone find your home. Walk along your street and look at how the house numbers change. In which direction do the numbers get bigger and in which direction do they get smaller? How do the numbers on houses or buildings next to each other change? Is every number used? What happens to the numbers when you go to the other side of the street or cross an intersection?



If you live in an apartment or visit someone in an apartment, help your child look at the way the apartments are numbered. Do different buildings use different systems?

What does your street name tell people? If possible, during your walk look for a house number that is the same as yours, but on a different street. What does the city name tell us? Do you live in the city or town that is used in your address, or do you live outside of the town? What is the name of your state? Is it in your address? What does a zip code tell us? Where is the zip code in your address?

Look at maps together with your child. Help find your street on a city map; find your city, town or area on a state map; look for your state on a larger map. Ask your child to describe how your state looks different from the states around it.
(Wayfinding and Transportation)

Suggestion: Let your child's interest determine how much time you spend on any of these activities.



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LETTERS

Encourage your child to send a letter to a relative or friend who lives somewhere else. This could be a picture or a message written by the child or for the child by you. Let your child help address cards and envelopes, put on stamps, lick envelopes, etc. In these days when it's so easy to telephone, children still enjoy sending and receiving mail. (Energy and Communication)



FAMILIES

Who are the members of your family? Help your child make a simple family tree or draw a picture of your family. Include grandparents, aunts, uncles and cousins. Find photographs of family members.

Use a map to find where relatives live. Talk about distances and help your child discover how you might travel to your relatives' homes. (Learning, Wayfinding and Transportation)

WHO LIVES IN YOUR HOME?

Have your child make a "family portrait" of everyone who lives in your home. In addition to the people, you may have pets that could be included in this portrait. When your child finishes, hang it in a special place where the entire family can enjoy it. (Learning)



Dear Family,

During the school year I will be sending a family newsletter home with your child. It tells about science, health, and technologies studied at school and suggests some activities you may try with your child. I hope that these activities will help your child understand that the ideas studied at school are part of everyday life.

Here are some things that may make these activities more fun.

- Involve the whole family.
- Begin with the activities that are most interesting to your child.
- You or your child may think of activities or experiments that will extend those that are suggested in the newsletter. For example, collecting stones or leaves may grow into a year-round project.
- If your child is interested in a particular topic, don't forget your local library as a resource. Your library will have many books about topics your child maybe interested in. Your child may want to share the books at school.
- Don't worry about completing all the suggested activities. You may want to save the newsletters to do some of the activities later.

I hope you enjoy helping your child learn with the *DASH on Home* newsletters.

Sincerely,

**SAMPLE OF HOW YOU CAN "PERSONALIZE" AN ADDITIONAL
PAGE TO A NEWSLETTER**

DASH NEWS from ROOM 10

*Display a child's drawing of
a class pet here.*



*Remember to give credit
to the child artist.*

OUR NEW PET Our class has a "new" student. It is a Russian Dwarf Hamster. Rm. 10 has named its new friend Bella. She resides in her very own clear plastic house (which makes it easy to observe her actions). There are separate areas for eating, exercising and sleeping. We'll tell you more about Bella in the next newsletter.

A FEAST FIT FOR A KING!

Our class at All American Elementary School enjoyed a delicious ending to their study of food and teeth. A first annual Friendship Luncheon was prepared and cooked by the kindergarten students under the supervision of DASH teachers Mrs. Smith and Miss Jones. In coordination with the DASH food cluster, students listened to and dramatized the story, "Stone Soup," and then prepared their own version in the classrooms. They also made homemade butter, peanut butter and fruit salad. With much help from parents, the students wearing their own apron creations, made individual loaves of bread. All of these nutritious items were part of a feast during a sit-down lunch at school. Parents became the waitresses and busboys to add the final touch to a super and filling lunch!

Be sure to include the children's and parent's names to the story.



Be sure to use a child's drawing here and give the artist credit.

SPRING HAS BLOOMED AT OUR SCHOOL!

The bulbs which the children planted in the fall are adding a colorful touch to the playground! We would like to keep the garden colorful through the summer months. In order to do this, we need top soil. The children have planted marigolds indoors and are almost ready to transplant them to the area around the flag pole. If we could put a layer of top soil down our plants would have a better chance of survival. If you can help us, please give the school a call- 555-5555. Thank you!